

FURUNO

INSTALLATION MANUAL

MARINE RADAR MODEL1823C

MARINE RADAR MODEL1833C

MARINE RADAR MODEL1933C

MARINE RADAR MODEL1943C

MARINE RADAR MODEL1953C

MODEL COLOR VIDEO PLOTTER GD-1900C

NAVnet



FURUNO ELECTRIC CO., LTD.

NISHINOMIYA, JAPAN



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SAFETY INSTRUCTIONS

WARNING



Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Turn off the power at the mains switch-board before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

CAUTION



Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass.

	Standard	Steering
Display unit	0.60 m	0.40 m
MODEL1823C antenna unit	1.25 m	0.85 m
MODEL1833C antenna unit	0.90 m	0.70 m
MODEL1933C antenna unit	1.00 m	0.80 m
MODEL1943C antenna unit	1.00 m	0.80 m
MODEL1953C antenna unit	1.00 m	0.75 m
Power supply unit (1953C)	1.40 m	0.95 m
Memory card IF unit (option)	0.90 m	0.60 m

WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

Distances at which RF radiation levels of 100 and 10 W/m² exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible - Ask your FURUNO representative or dealer to provide this feature.

MODEL	Distance to 100 W/m ² point	Distance to 10 W/m ² point
MODEL 1823C	Nil	Worst case 0.50 m
MODEL 1833C	Nil	Worst case 0.50 m
MODEL 1933C	Nil	Worst case 3.00 m
MODEL 1943C	Nil	Worst case 2.50 m
MODEL 1953C	XN12A	Worst case 2.50 m
	XN13A	Worst case 2.30 m

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EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Display unit	RDP-138*	-	1	Normal bright LCD, 300 Cd
	RDP-139	-		High bright LCD, 700 Cd
Antenna unit	RSB-0094-0075	-	1	MODEL 1823C
	RSB-0071-057	-		MODEL 1833C
	XN10A-RSB-0070-064	-		MODEL1933C, 24 rpm, for RDP-138/139
	XN10A-RSB-0073-064	-		MODEL1933C, 48 rpm, for RDP-138
	XN12A-RSB-0070-059	-		MODEL1943C, 24 rpm
	XN12A-RSB-0073-059	-		MODEL1943C, 48 rpm
	XN12A-RSB-0072-060	-		MODEL1953C, 4", 24 rpm
	XN12A-RSB-0073-060	-		MODEL1953C, 4", 48 rpm
XN13A-RSB-0072-060	-	MODEL1953C, 6", 24 rpm		
Power supply unit	PSU-005	-	1	For MODEL1953C
Remote controller set	RMC-100	000-089-885	1	Remote controller, vinyl case, battery, labels
Installation materials	CP03-22700	000-080-049	1set	For display unit, MJ-A3SPF0018-050Z cable, CP03-22701
	CP03-25401	008-443-160	1set	For MODEL1823C antenna unit
	CP03-16901	008-478-750	1set	For MODEL1833C antenna unit
	CP03-21800	000-080-014	1	For MODEL1823C/1833C 10 m signal cable
	CP03-21810	000-080-015		For MODEL1823C/1833C 15 m signal cable
	CP03-21820	000-080-016		For MODEL1823C/1833C 20 m signal cable
	CP03-21830	000-080-017		For MODEL1823C/1833C 30 m signal cable
	CP03-22000	000-080-021	1	For 1933C/1943C/1953C 10 m signal cable
	CP03-22010	000-080-022		For 1933C/1943C/1953C 15 m signal cable
	CP03-22020	000-080-023		For 1933C/1943C/1953C 20 m signal cable
	CP03-22030	000-080-024		For 1933C/1943C/1953C 30 m signal cable
	CP03-18401	008-503-360	1	For 1933C/1943C/1953C antenna unit
	CP03-22901	008-523-690	1	For 1933C/1943C/1953C antenna radiator XN10A/XN12A
	CP03-24500	000-080-191	1	For 1953C, power supply unit
Accessories	FP03-09301	008-522-970	1set	Card remover
Spare parts	SP03-14001	000-080-018	1set	Fuses, for display unit
	SP03-14001	000-080-018	1set	Fuses, for power supply unit (1953C only)

*Not available for MODEL 1953C

Optional supply

Name	Type	Code No.	Qty	Remarks
Rectifier	PR-62	000-013-484	1	For GD-1900C, 100 VAC
		000-013-485		For GD-1900C, 110 VAC
		000-013-486		For GD-1900C, 220 VAC
		000-013-487		For GD-1900C, 230 VAC
	RU-3423	000-030-443	1	For MODEL series
External buzzer	OP03-136	000-086-443	1	
Cable assy.	MJ-A6SPF0014-010	000-144-421	1	For NavNet, 1 m
	MJ-A6SPF0014-050	000-144-422	1	For NavNet, 5 m
	MJ-A6SPF0014-100	000-144-423	1	For NavNet, 10 m
	MJ-A6SPF0014-200	000-144-424	1	For NavNet, 20 m
	MJ-A6SPF0014-300	000-144-425	1	For NavNet, 30 m
	MJ-A6SPF0012-050	000-134-424	1	For navaid, 5 m
	MJ-A6SPF0012-100	000-133-817	1	For navaid, 10 m
	MJ-A6SPF0003-050	000-117-603	1	w/6P connector, 5 m
	MJ-A6SPF0009-100	000-125-236	1	w/6P connector, 10 m
	MJ-A6SPF0007-100	000-125-237	1	For compass, 10 m
	MJ-A7SPF0007-050	000-144-418	1	For external buzzer, PC, w/7P connector, 5 m
	MJ-A6SRMD/TM11AP8-005	000-144-463	1	Adapter cable for HUB
	MJ-B24LPF0008-100	000-145-125	1	For remote display, 10 m
	MJ-B24LPF0008-200	000-145-126	1	For remote display, 20 m
MJ-B24LPF0008-300	000-145-127	1	For remote display, 30 m	
RGB output cable kit	OP03-176	008-526-360	1	For external monitor
ARP kit	ARP-11	008-523-050	1	ARP Board, for radar only
NTSC/PAL interface kit	OP03-175	008-523-070	1	Connection video source
Mounting bracket (1)	OP03-92	008-445-070	1	For MODEL1833C
Mounting bracket (2)	OP03-93	008-445-080	1	For MODEL1823C
Chart card	-	-	-	Specified when ordering.
RAM card	00RAM02MC-004	004-371-790	1	2 MB
Remote controller set	RMC-100	000-089-885	1	
Modification kit for C-map	MODEL17*2/C-MAP	008-525-200	1	See modification instruction E42-00005-x
EMI core	E04R241336A	000-146-335	1	For remote display cable connection
Memory card interface unit	CU-200-NAV	000-081-567	1	w/two chart card slots

SYSTEM CONFIGURATIONS

All NavNet products incorporate a “network circuit board” to integrate each NavNet product on board through an optional LAN cable (Ethernet 10BASE-T). Each NavNet product is assigned an IP address to enable transfer of images between other NavNet products. For example, video plotter pictures can be transferred to a radar and vice versa. Pictures received via the NavNet may be adjusted at the receiving end.

The number of display units which may be installed depends on the number of network sounder connected. For a system incorporating three or more products, a “hub” is required to process data.

For one network sounder: one radar and three plotters, or four plotters
 For two network sounder: one radar and two plotters, or four plotters

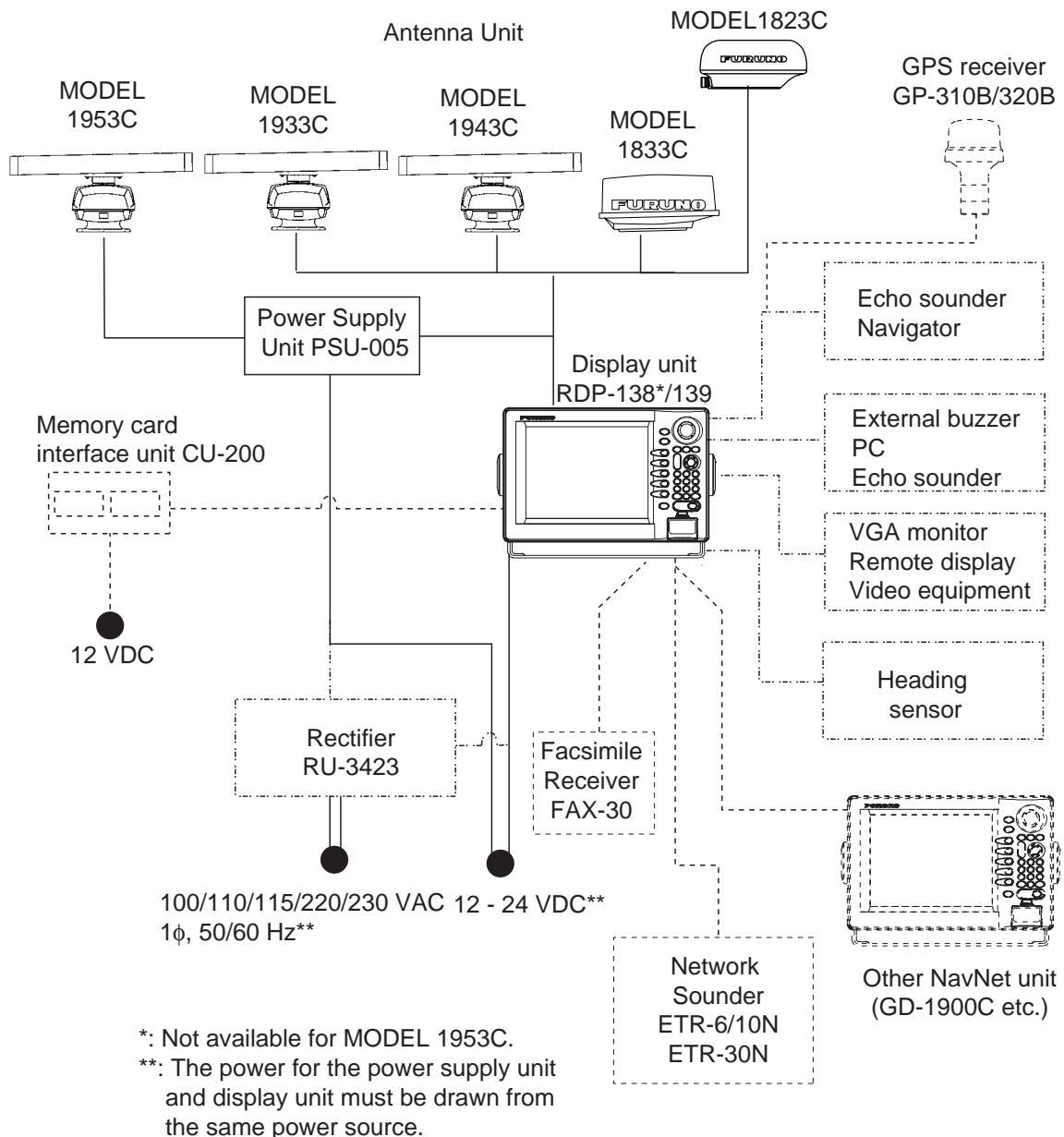


Figure 1 (a) NavNet system (MODEL 1823C/1833C/1933C/1943C/1953C)

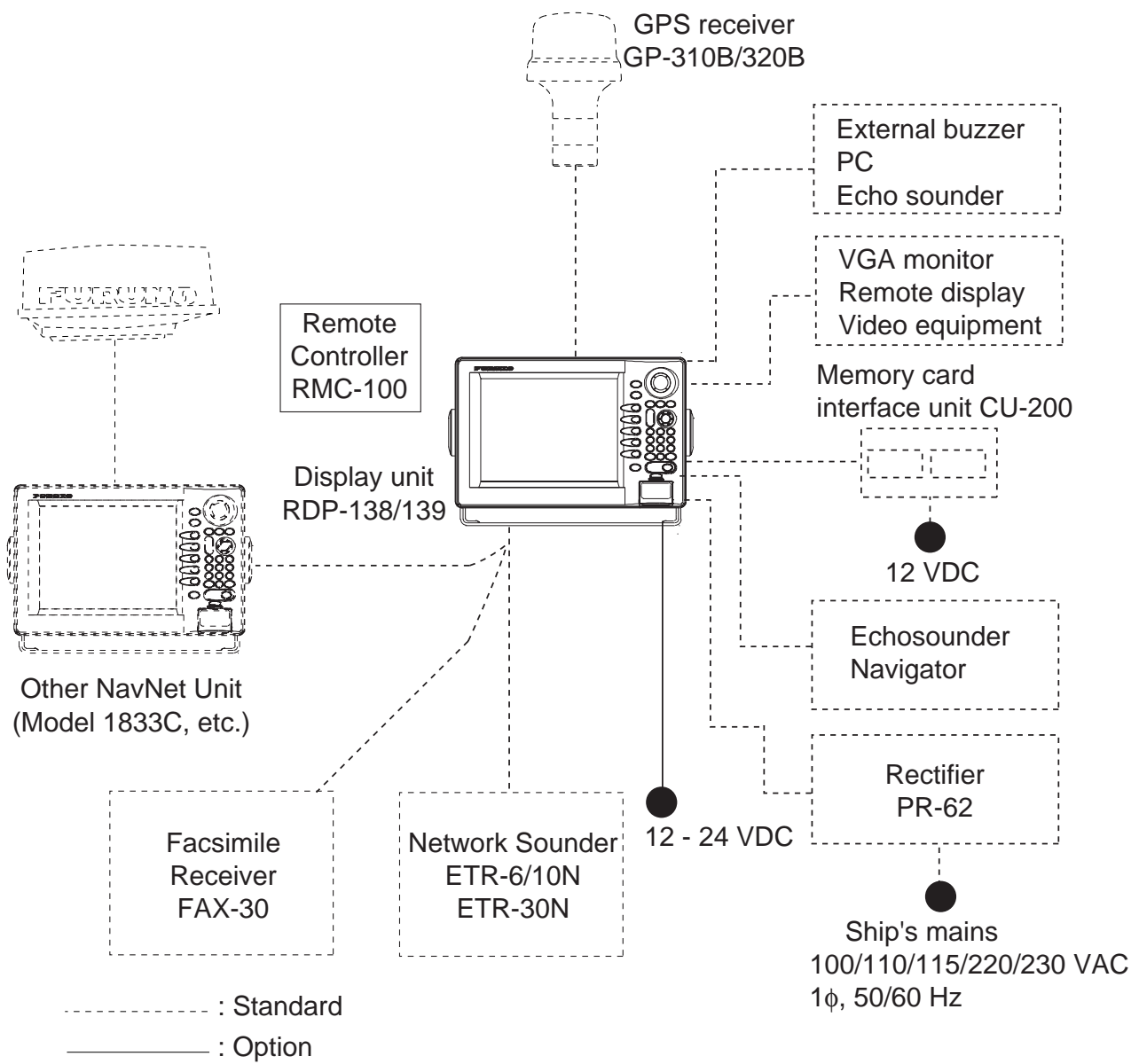


Figure 1 (b) NavNet system (GD-1900C)

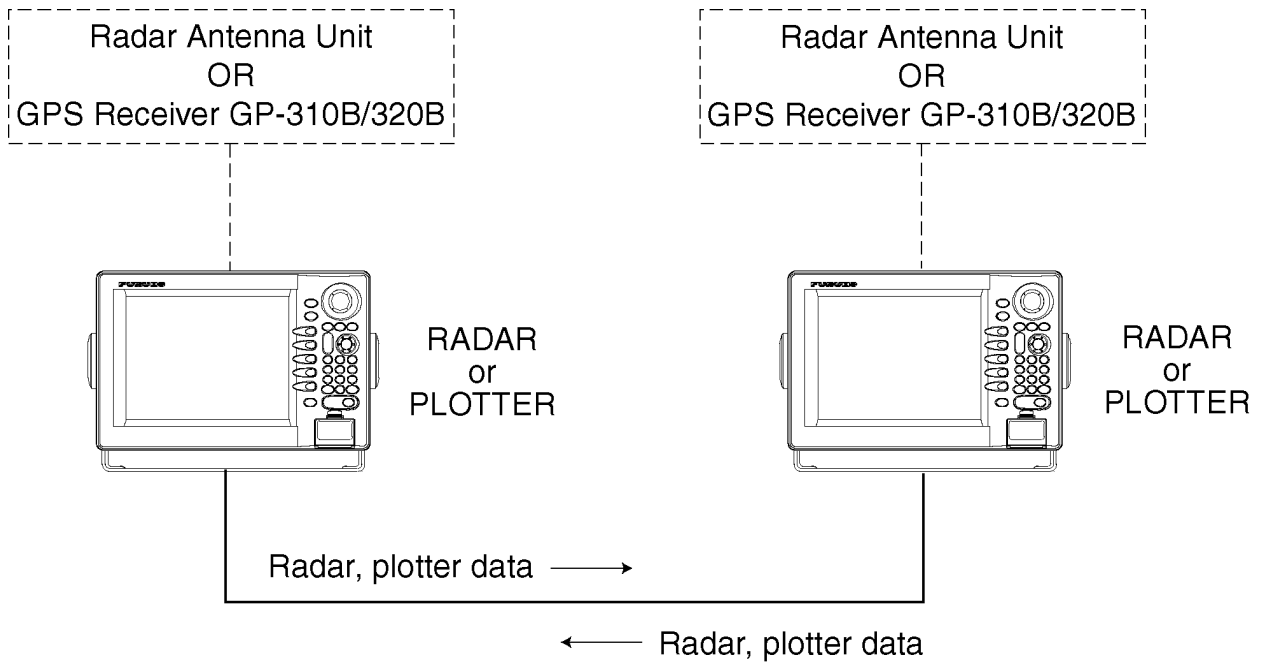


Figure 2 (a) NavNet system, three-unit connection

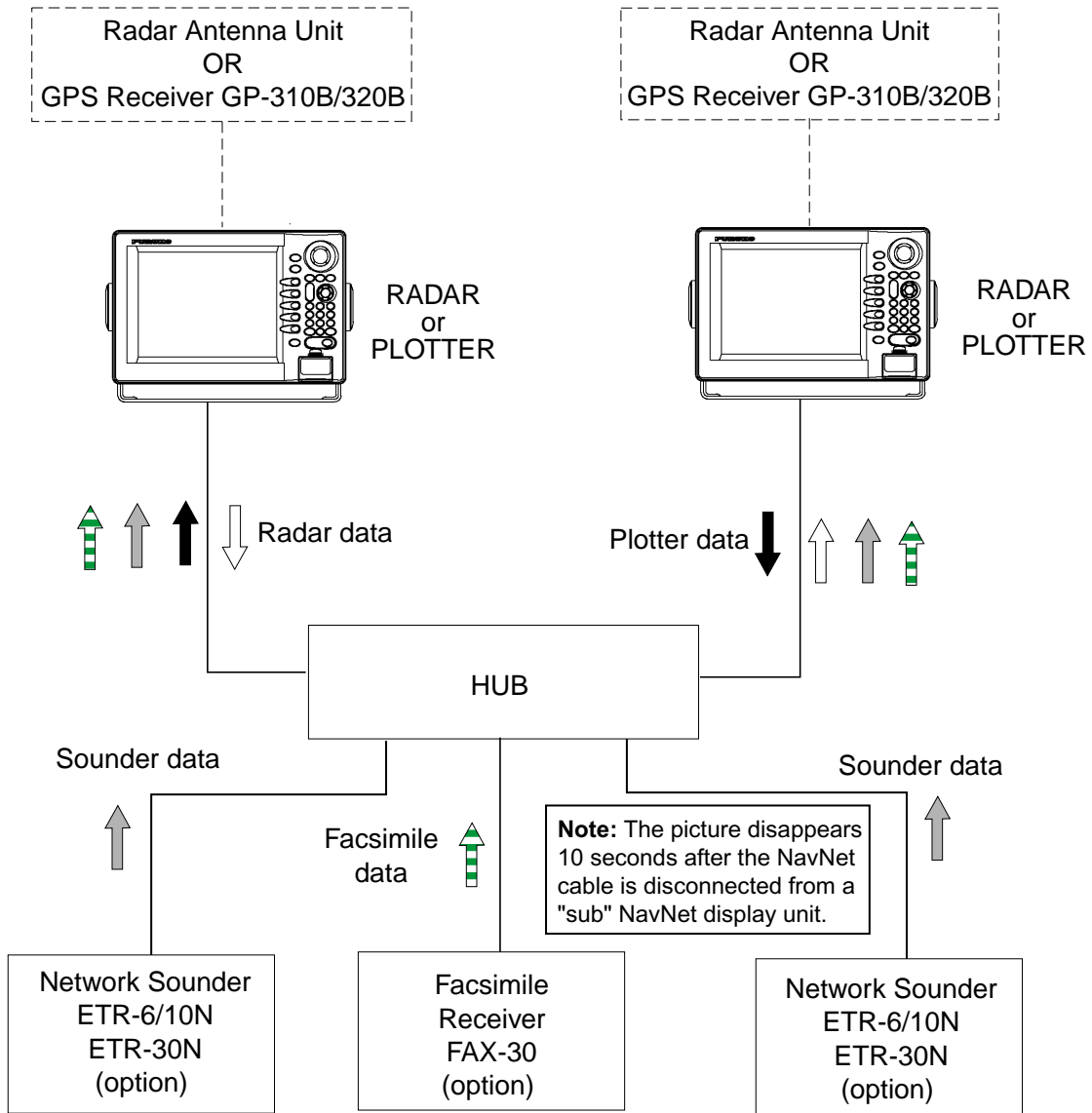


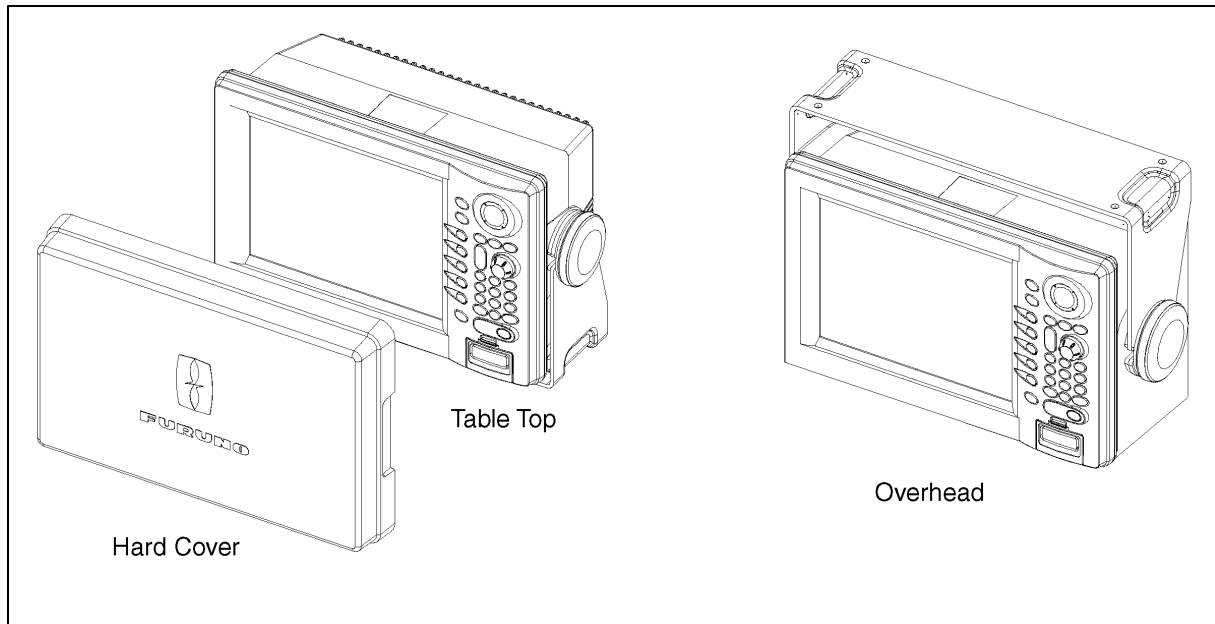
Figure 2 (b) NavNet system, two-unit connection

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1. MOUNTING

1.1 Installation of Display Unit

The display unit can be installed on a tabletop, on the overhead or flush mounted in a console or panel.



Tabletop, overhead mounting method

When selecting a mounting location for the display unit keep the following in mind:

- Keep the display unit out of direct sunlight.
- The temperature and humidity should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away electromagnetic field generating equipment such as motor, generator.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables.
- A magnetic compass will be affected if the display unit is placed too close the magnetic compass. Observe the following compass safe distances to prevent disturbance to the magnetic compass.

Standard compass: 0.60 m

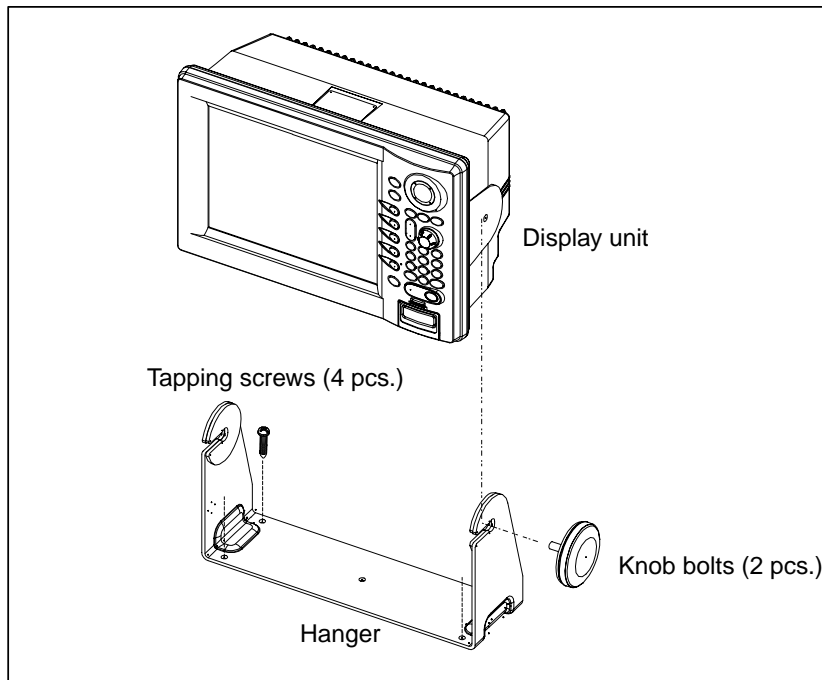
Steering compass: 0.40 m

1.1.1 Mounting procedure

Tabletop, overhead mounting

Follow the procedure below to mount the display unit on a tabletop or the overhead.

1. Fix the hanger by four tapping screw (5x20).
2. Screw knob bolts in display unit, set it to hanger, and tighten knob bolts.
3. Attach hard cover to protect LCD.

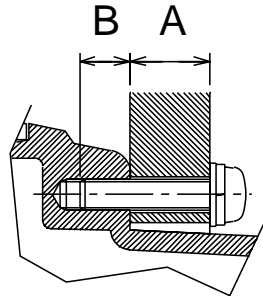


Tabletop, overhead mounting of display unit

Note: For the overhead mounting, reinforce the mounting location and secure the hanger, with bolts, nuts and washers (local supply).

Flush mounting

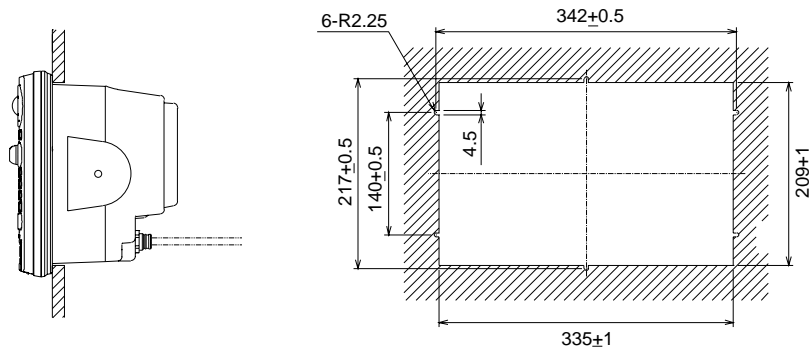
Note: Use supplied six pan head screws when the thickness of the bulkhead is from 11 to 14 mm. For bulkhead which exceeds 14 mm in thickness the length of the pan head screws should be bulkhead thickness (A) plus 7.8 ± 2 mm. Also the length of B should be max. 8 mm.



A: thickness of bulkhead

Fixing screw, side view

1. Prepare a cutout in the mounting location by using the template sheet supplied as the installation material.
2. Fix the display unit by six washer head screws M4x20. Refer to the outline drawing at back of this manual.



Flush mounting of display unit

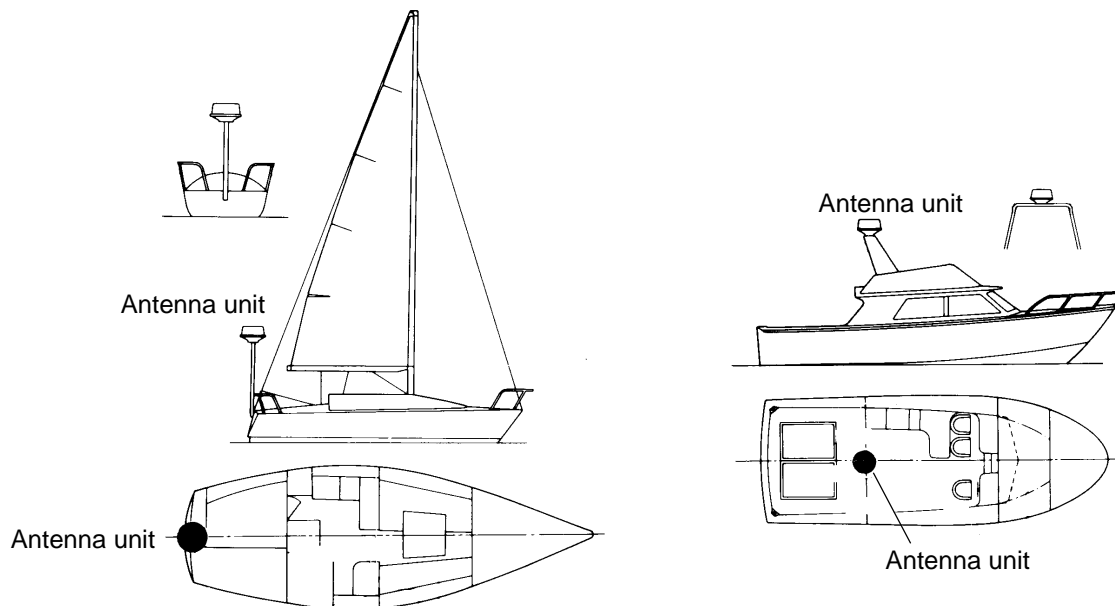
Note: When installing the display unit in a panel, attach the vinyl tube ($\Phi 6$, local supplied) to the drain hole to allow moisture to escape. Then fasten the tube to the drain hole with a cable tie.

1.2 Mounting of Antenna Unit for MODEL1833C

1.2.1 Mounting considerations

When selecting a mounting location for the antenna unit keep in mind the following points.

- Install the antenna unit on the hardtop, radar arch or on a mast on an appropriate platform. (For sailboats, a mounting bracket is optionally available.) It should be placed where there is a good all-round view with, as far as possible, no part of the ship's superstructure or rigging intercepting the scanning beam. Any obstruction will cause shadow and blind sectors. A mast, for instance, with a diameter considerably less than the width of the antenna unit, will cause only a small blind sector. However, a horizontal spreader or crosstrees in the same horizontal plane would be a much more serious obstruction; place the antenna unit well above or below it.

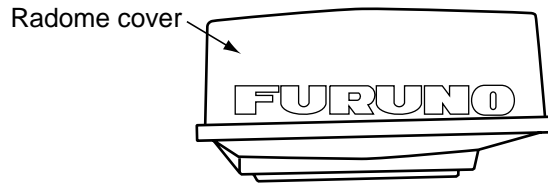


Typical antenna unit placement on sailboat and powerboat

- In order to minimize the chance of picking up electrical interference, avoid where possible routing the antenna cable near other electrical equipment onboard. Also avoid running the cable in parallel with power cables.
- The compass safe distance of 0.90 meters (standard compass) and 0.70 meters (steering compass) should be observed to prevent deviation of the magnetic compass.

1.2.2 Mounting antenna unit of MODEL 1833C

1. Open the antenna unit packing box carefully.
2. Unbolt the four bolts at the base of the radome to remove the radome cover.

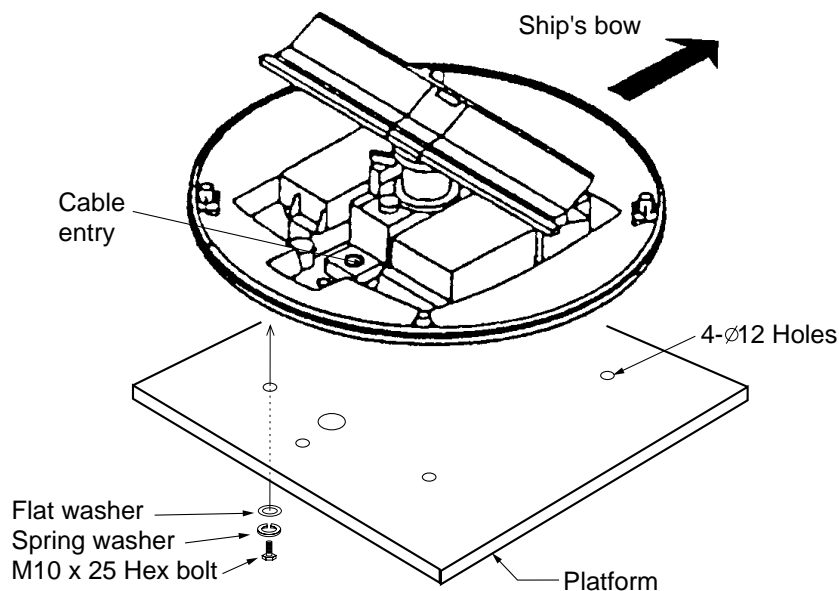


Antenna unit

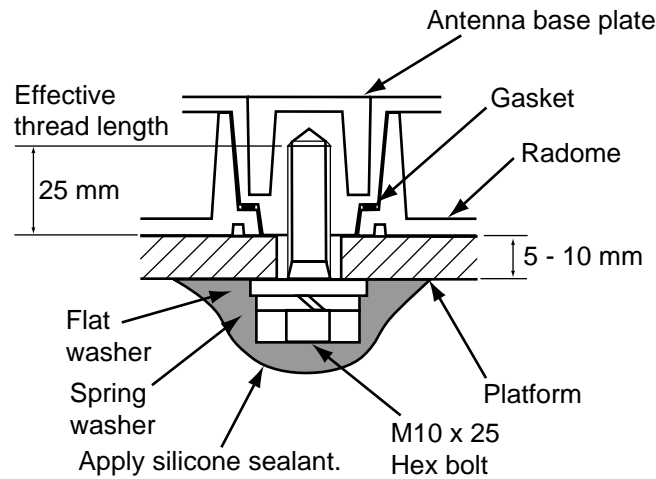
The mounting surface must be parallel with the waterline and provided with five holes (four fixing holes and one cable entry) whose dimensions are shown in the outline drawing attached at the end of this manual.

The unit is adjusted so a target echo returned from the bow direction will be shown on the zero degree (heading line) position on the screen. When drilling holes, be sure they are parallel with the fore and aft line.

3. Prepare a platform of 5 to 10 millimeters in thickness for the antenna unit.
A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-9.) Find the cable entry on the radome base. Next, position the radome base so the cable entry faces the stern direction. This alignment must be as accurate as possible.



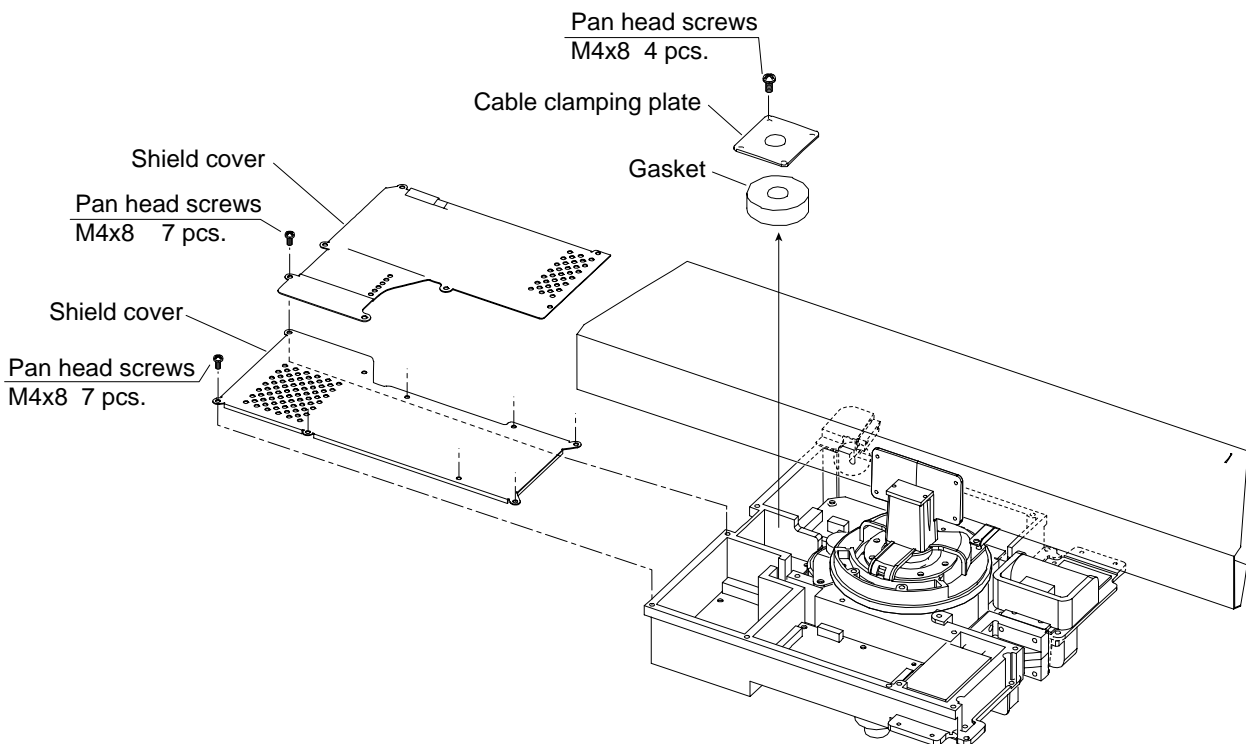
Antenna unit, cover removed



How to fasten the radome base to the mounting platform

Wiring and final preparation

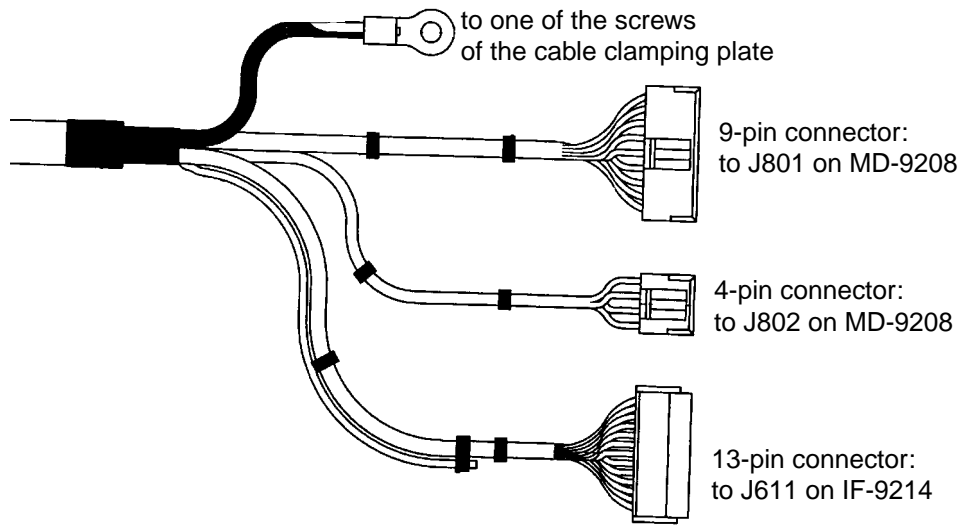
4. Drill a hole of at least 20 millimeters diameter through the deck or bulkhead to run the signal cable between the antenna unit and the display unit. (To prevent electrical interference avoid running the signal cable near other electrical equipment and in parallel with power cables.) Pass the cable through the hole. Then, seal the hole with sealing compound for waterproofing.
5. Remove two shield covers in the radome.
6. Remove the cable clamping plate by unfastening four screws and removing a gasket.



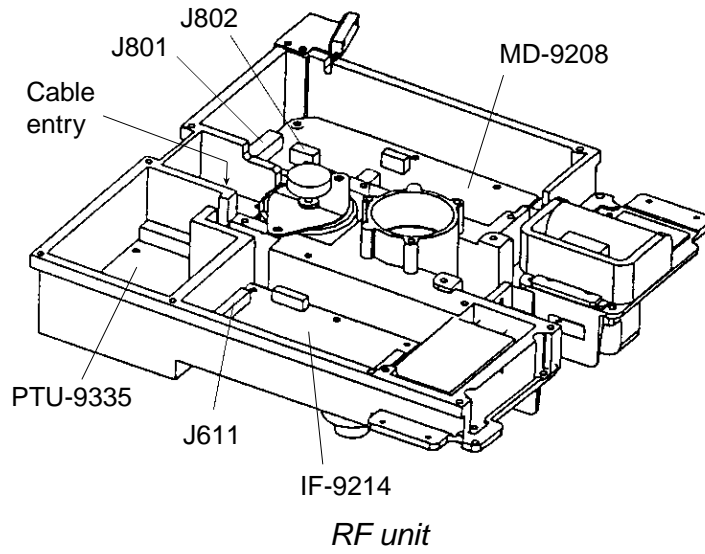
Antenna unit, inside view

7. Pass the cable through the hole at the bottom of the radome base.
8. Secure the cable with the cable clamping plate and gasket. Ground the shield wire by one of the screws of the cable clamping plate.

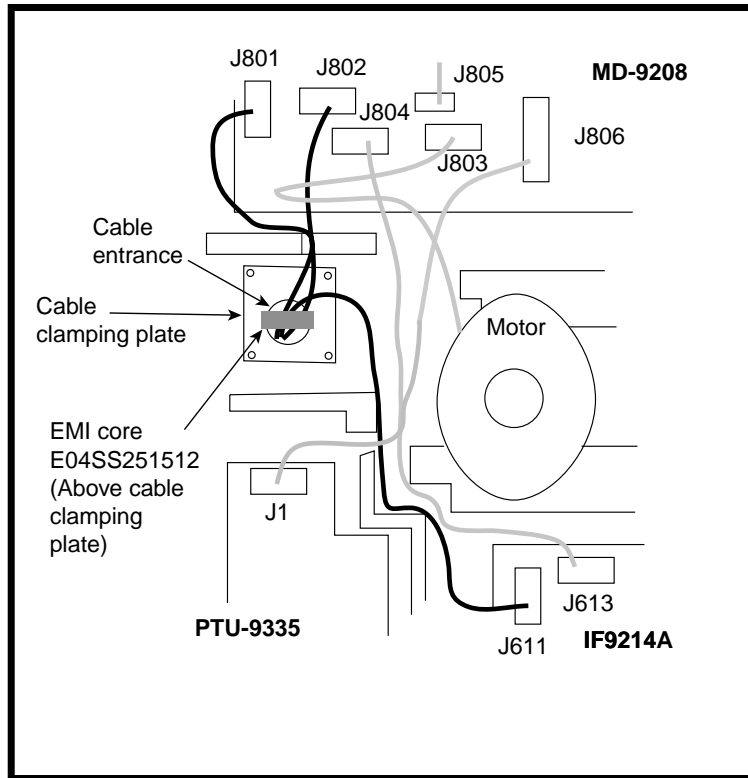
9. Attach three connectors of the signal cable to respective ports as shown below.



Signal cable, antenna unit side

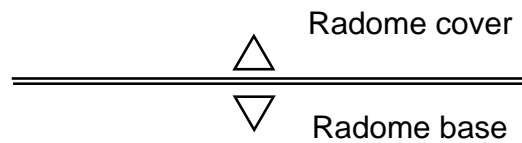


10. Attach the EMI cores supplied as shown below.



How to attach EMI core

- 11. Fix the shield cover. Do not pinch the cable.
- 12. Attach the radome cover, aligning triangle mark on radome cover with that on radome base.



How to position the radome cover

- 13. Loosely fasten the radome fixing bolts. You will tighten them after confirming magnetron heater voltage.

1.2.3 Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit for MODEL1833C to a mast on a sailboat is optionally available.

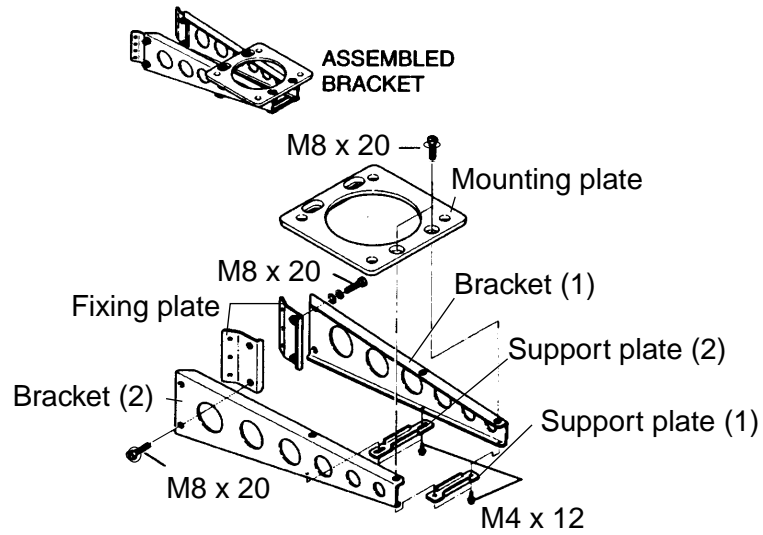
Mounting bracket 1

Type: OP03-92
Code No.: 008-445-070

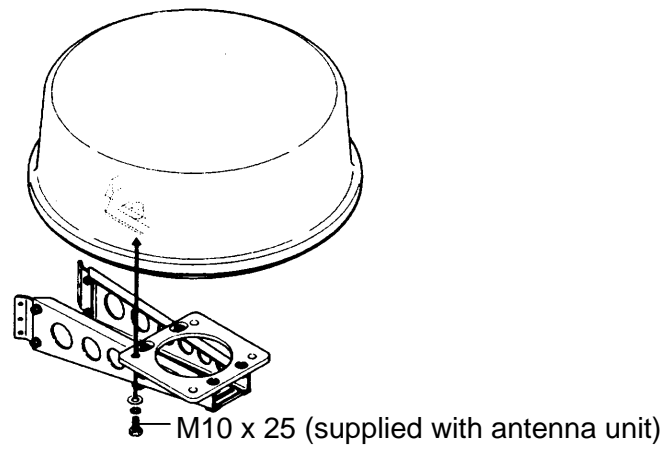
Table 1-1 Mounting bracket contents

	Type	Code No.	Qty
Hex. bolt	M4X12	000-804-725	4
Hex. bolt	M8X20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-018-9002-1	100-206-751	1
Bracket (2)	03-018-9003-1	100-206-761	1
Fixing plate	03-018-9004-1	100-206-771	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket.



(A) Assembling the mounting bracket



(B) Fastening antenna to mounting bracket

How to assemble and mount the optional mounting bracket

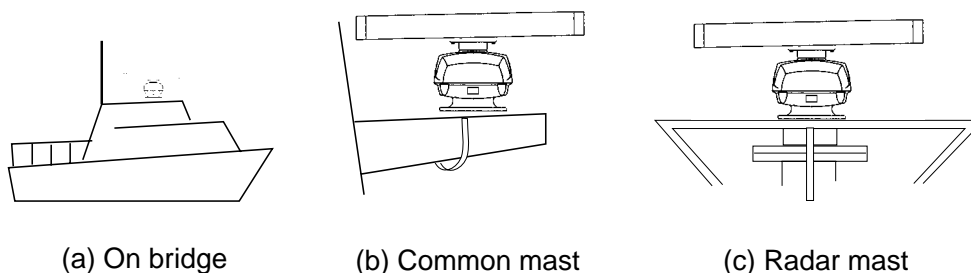
1.3 Mounting of Antenna Unit for MODEL 1933C/1943C/1953C

1.3.1 Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the antenna unit where there is a good all-round view. Any obstruction will cause shadow and blind sectors. A mast for instance, with a diameter considerably less than the width of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the antenna unit would be a much more serious obstruction; you would need to place the antenna unit well above or below it.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- If you have a radio direction finder on your boat, keep the antenna unit from its antenna more than two meters to prevent the interference to the direction finder.
- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also avoid running the cable in parallel with power cables.
- A magnetic compass will be affected if the antenna unit is placed too close to the magnet compass. Observe the following compass safe distances to prevent deviation of a magnetic compass: Standard compass, 1.00 m, Steering compass, 0.80 m (1953C: 0.75 m).
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
 - a) When this radar is to be installed on larger vessels, consider the following points:

The signal cable run between the antenna and the display comes in lengths of 10 m, 15 m, 20 m and 30 m. Whatever length is used it must be unbroken; namely, no splicing allowed.
 - b) Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.

As shown in the figure below, the antenna unit may be installed on the bridge, on a common mast or on the radar mast.



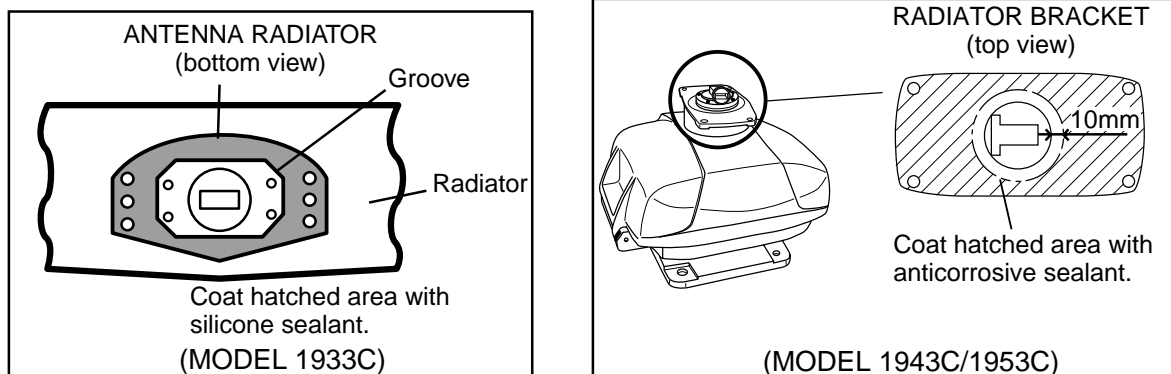
1.3.2 Mounting antenna unit of MODEL 1933C/1943C/1953C

Referring to the outline drawing at the back of this manual, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the antenna unit and one hole of 25-30 mm diameter for the signal cable.

Fastening the Radiator to the Radiator Bracket

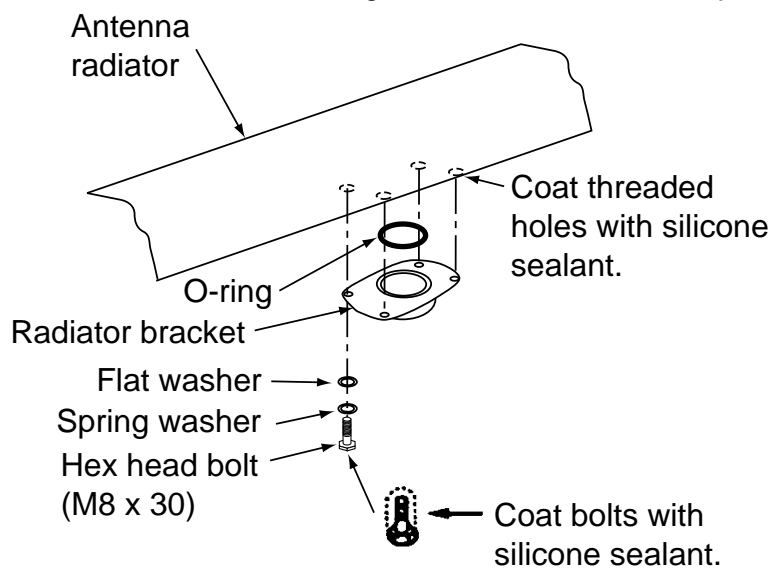
For your reference, antenna installation materials list appears in the packing lists at the back of this manual (see page A-6 to A-11).

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between antenna radiator and radiator bracket with silicone sealant as shown in figure below.



Coating the antenna with silicone sealant

3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the antenna radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.



Fastening the radiator bracket to the antenna unit chassis

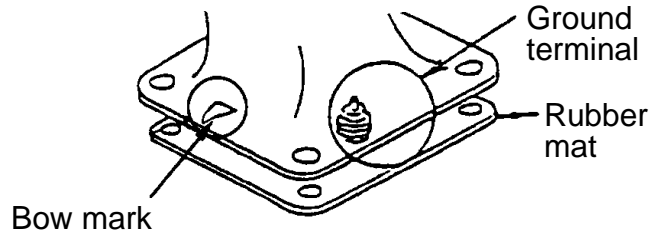
Mounting of antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200 x 200 mm) or inside (140 x 150 mm) the antenna unit.

Outside fixing holes

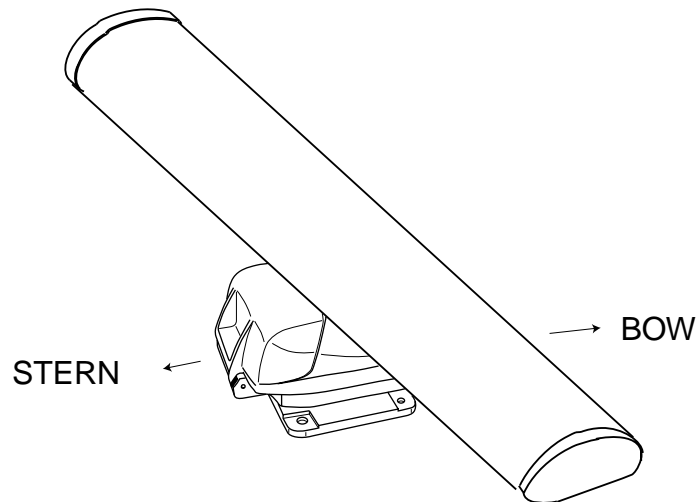
Use the hex head bolt (supplied) to mount the antenna unit as below.

1. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.



Location of rubber mat

2. Lay the antenna unit on the mounting platform, orienting it as shown in below.



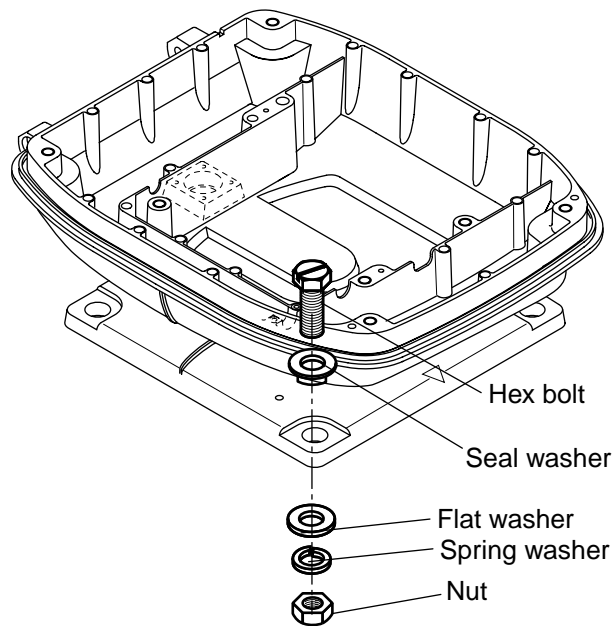
Antenna unit

CAUTION

Do not lift the Antenna unit by the radiator; lift it by the housing.

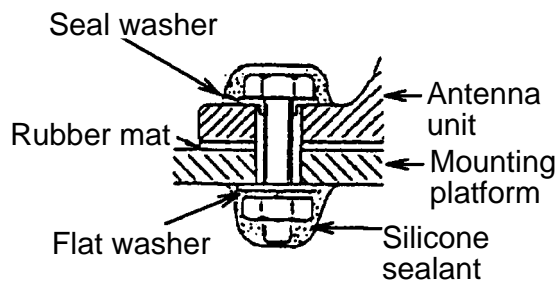
The radiator may be damaged.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing. Insert the seal washers with the larger diameter next to the bolt heads.



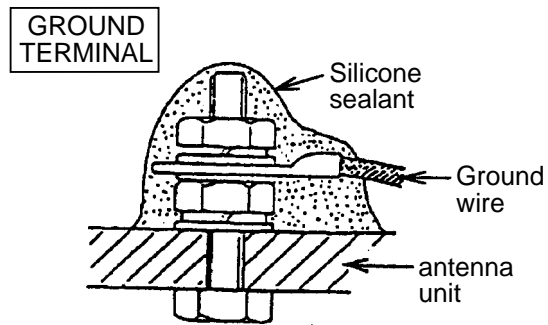
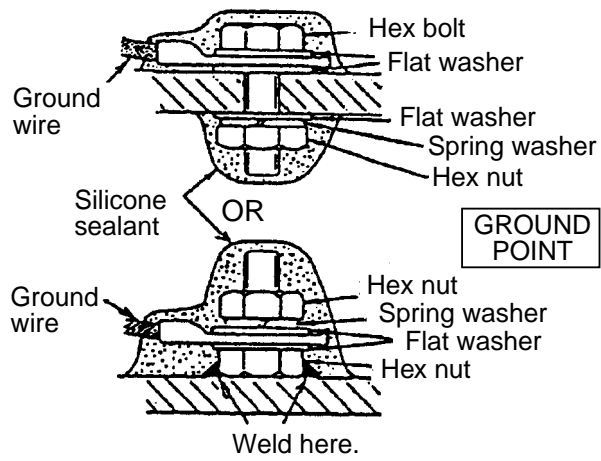
Fixing the antenna unit chassis

4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.



How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point in mounting platform (within 300 mm of ground terminal on antenna unit) using M6 x 25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.
8. Coat ground terminal and ground point with silicone sealant as shown on the next page.



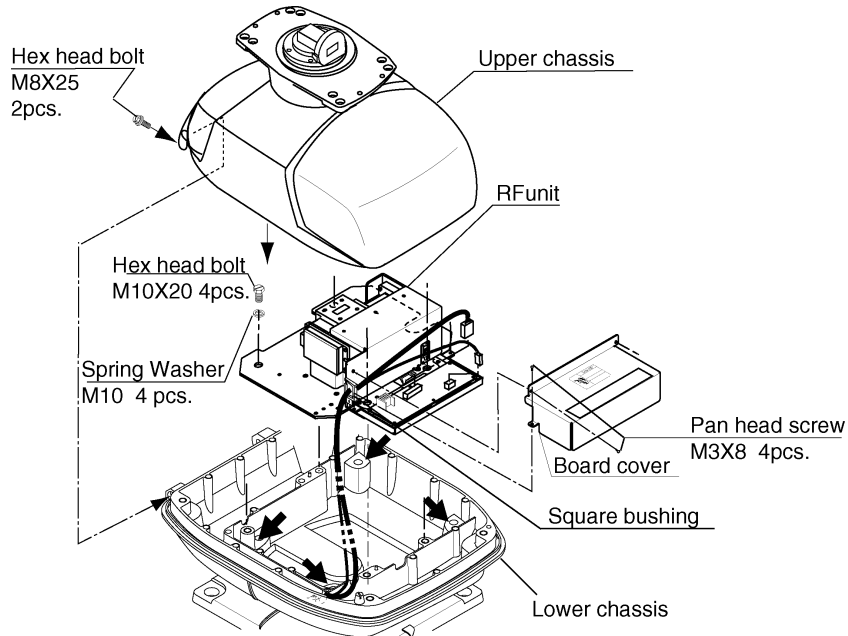
How to coat ground point and ground terminal with silicone sealant

Fixing holes inside antenna unit

This method requires removal of the RF unit in the antenna unit to access inside fixing holes. Use hex head bolts, flat washers, spring washers and nuts (local supply) to mount the antenna unit, confirming length of bolts.

1. Loose four scanner bolts to open the antenna unit.

Refer to figure in below for locations.



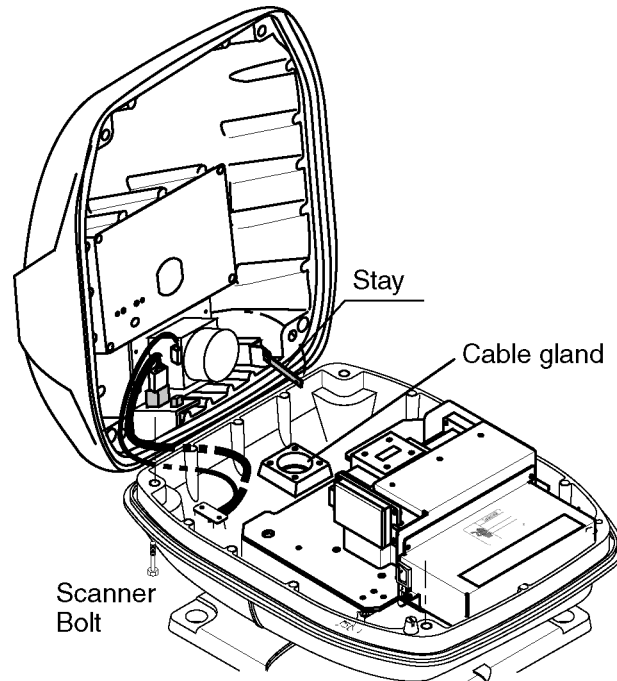
Antenna unit chassis, upper chassis separated

2. Unplug connector connected between upper and lower chassis.
3. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
4. Remove the board cover by unfastening four pan head screws.
5. Remove connector from RF unit.
6. Remove RF unit by unfastening four hex head bolts.
7. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
8. Fasten the lower chassis to the mounting platform with hex head bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in rubber bushing and insert bolt into bushing. Do not use seal washers.
9. Reassemble RF unit, cover and chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in "Outside fixing holes".

Connecting the Signal Cable

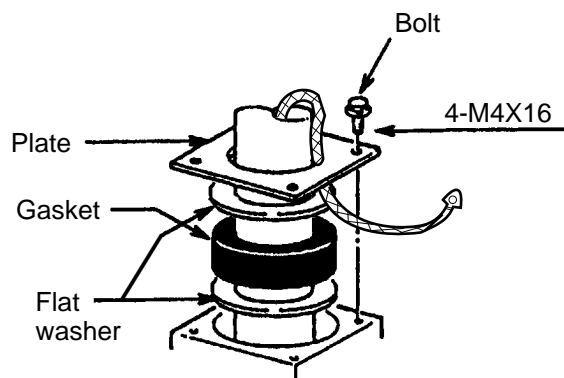
Only the signal cable runs from the display unit (1953C: power supply unit) to the antenna unit. In order to minimize the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also, avoid running the cable in parallel with power cables. Pass the cable through the hole and apply sealing compound around the hole for waterproofing.

1. Open the antenna cover by loosening four scanner bolts, and then fix the stay.



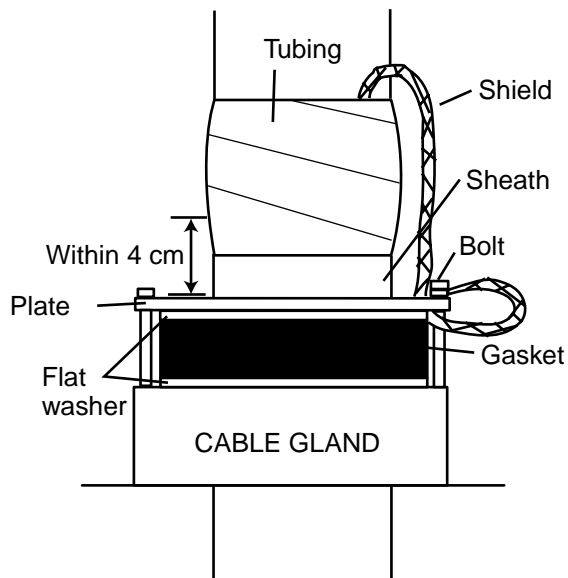
Antenna unit chassis, cover opened

2. Unfasten the cable gland assembly (plate, gasket, flat washer).
3. Pass the signal cable w/connector through the bottom of the scanner unit chassis. Pass the cable through the gland assembly as shown below.



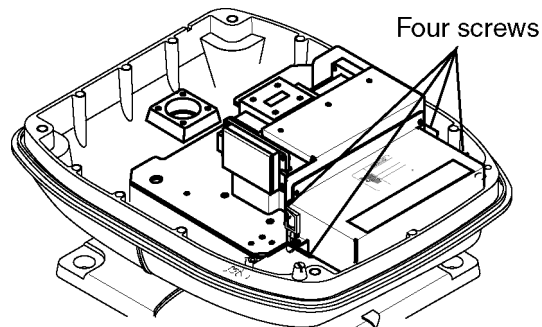
Passing the signal cable through the cable gland assembly

4. Fasten the crimp-on lug on the shield to one of the fixing bolts of the cable gland assembly.
5. Position the signal cable so that no more than 4 cm of the sheath is exposed as shown in the figure below. Tighten fixing bolts.



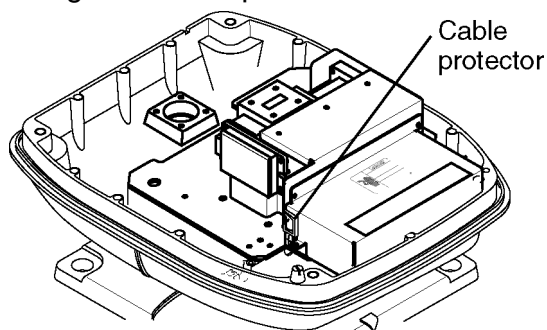
How to fix signal cable in cable gland

6. Unfasten four screws shown in the figure below.



Antenna unit chassis, cover opened

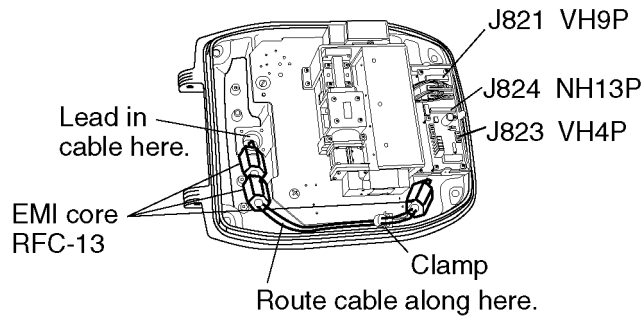
7. Pass the signal cable through the cable protector.



Antenna unit chassis, cover opened

8. Connect the signal cable to the RTB Board (03P9249), referring to the interconnection diagram and the figure below.

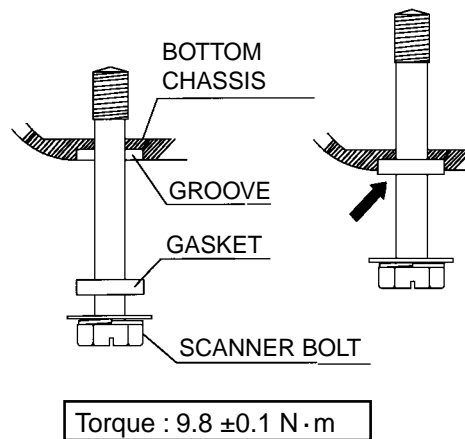
9. Attach three EMI cores to the signal cable as shown below.



Antenna unit chassis, cover opened

10. Fix the signal cable with the cable clamp.
11. Release the stay and close the cover. Loosely fasten the cover fixing screws; you will have to make some adjustments inside after completion of wiring.

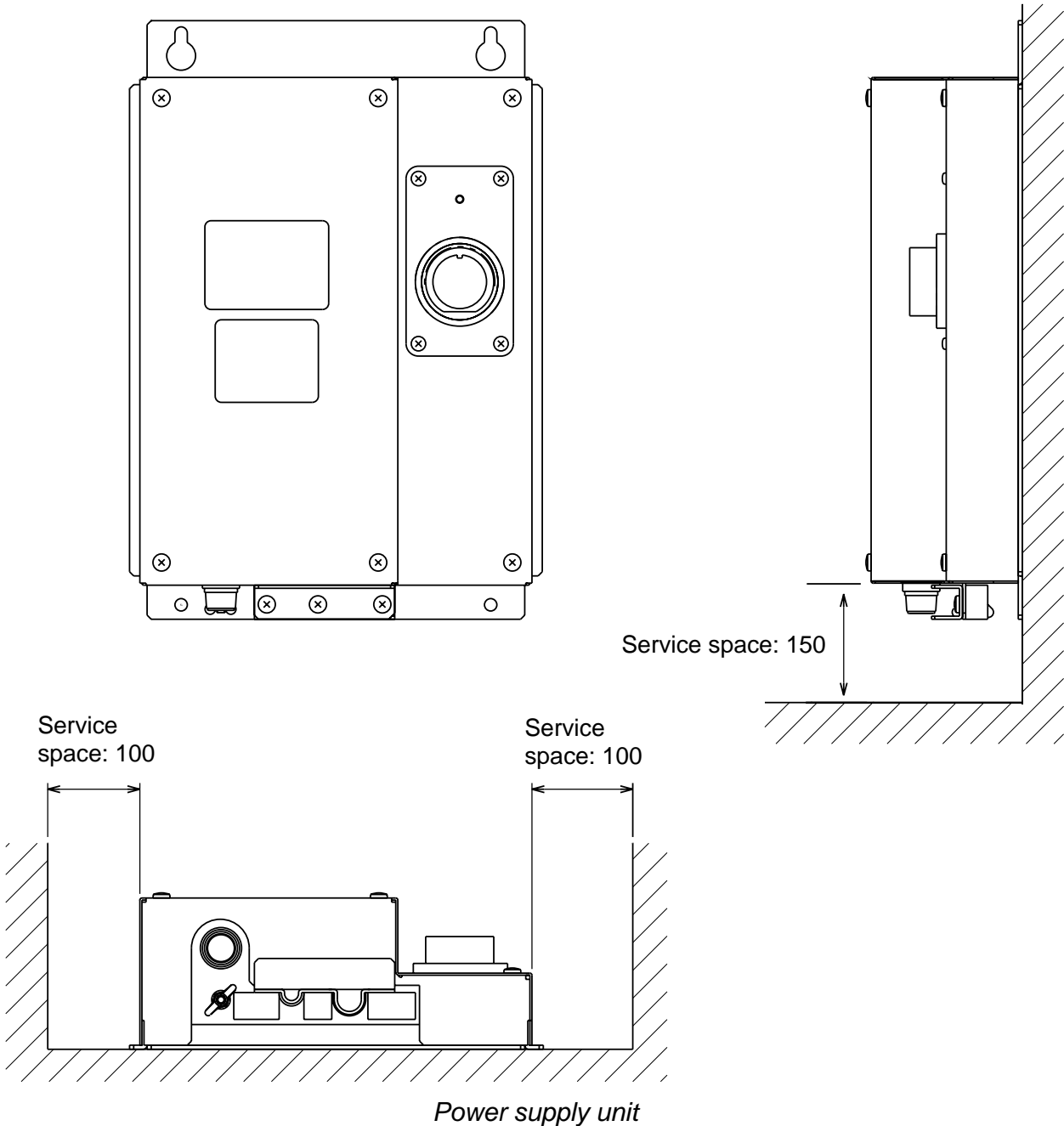
Note: When closing the cover, set the gaskets to grooves in the bottom chassis, then tighten bolts.



1.4 Mounting of Power Supply Unit for MODEL 1953C

MODEL 1953C has its own power supply because of high power consumption. The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided (within 5 m from the display unit).

Note: Do not install the power supply unit on the overhead.



1.5 Mounting of Antenna Unit for MODEL 1823C

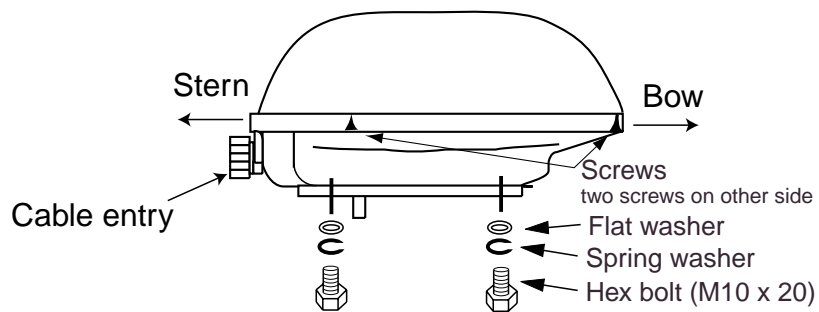
1.5.1 Mounting consideration

See the mounting consideration for MODEL1833C on page 1-4.

The compass safe distance of 1.25 meters (standard compass) and 0.85 meters (steering compass) should be observed to prevent deviation of the magnetic compass.

1.5.2 Mounting antenna unit of MODEL 1823C

1. Remove mounting hardware at the bottom of the antenna unit; four each of hex. bolts (M10X20), spring washers and flat washers. Save mounting hardware to use it to fix the antenna unit to the mounting platform later on.



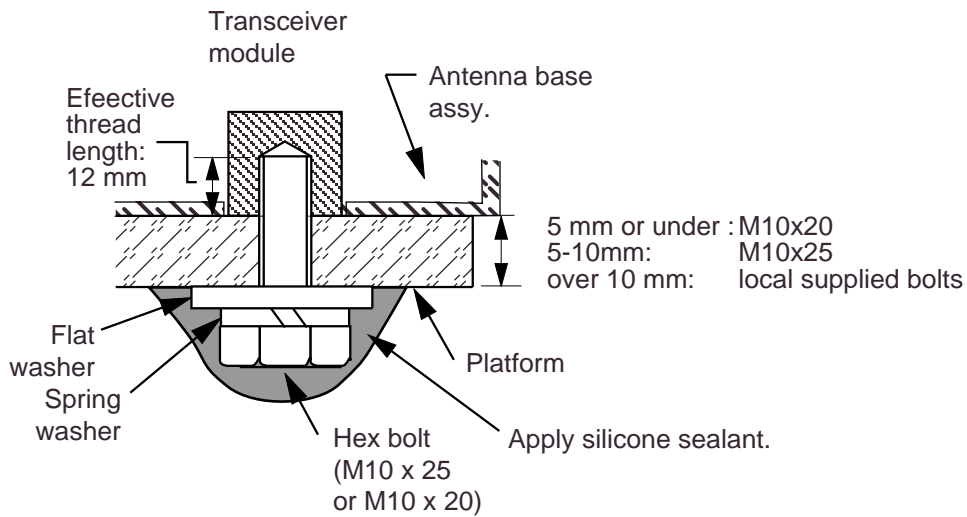
Antenna unit, showing location of mounting hardware

2. Construct a platform (wood, steel, or aluminum) of 5-10 mm (recommended dimension) in thickness referring to the outline drawing at back of this manual. A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-26.) Fasten the platform to the mounting location. Next, position the base so the cable entrance faces the stern direction.

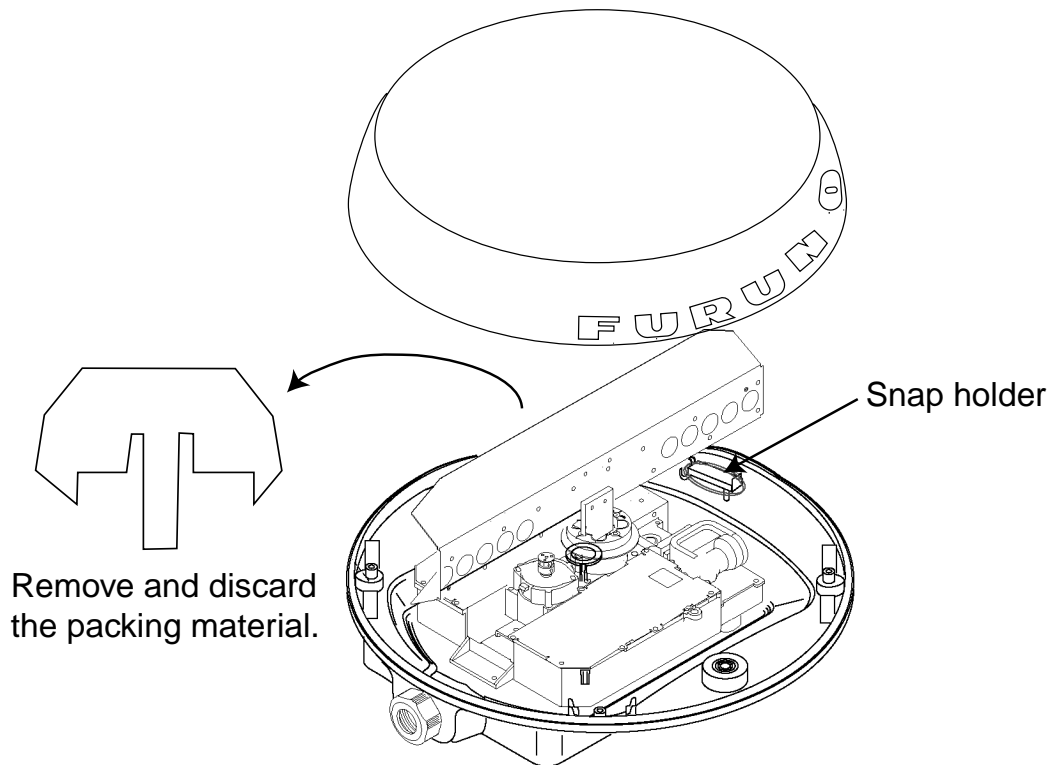
Note: When drilling holes in the platform, be sure they are parallel with the fore and aft line.

3. Using the hex bolts, flat washers and spring washers removed at step 1, fasten the base to the platform. **The torque should be between 19.6-24.5 N•m.**

Note: Longer hex bolts (M10X25) are supplied with the installation materials. Use them instead of the hex bolts removed earlier if the mounting platform thickness is 5–10 mm.



How to fasten the base to platform

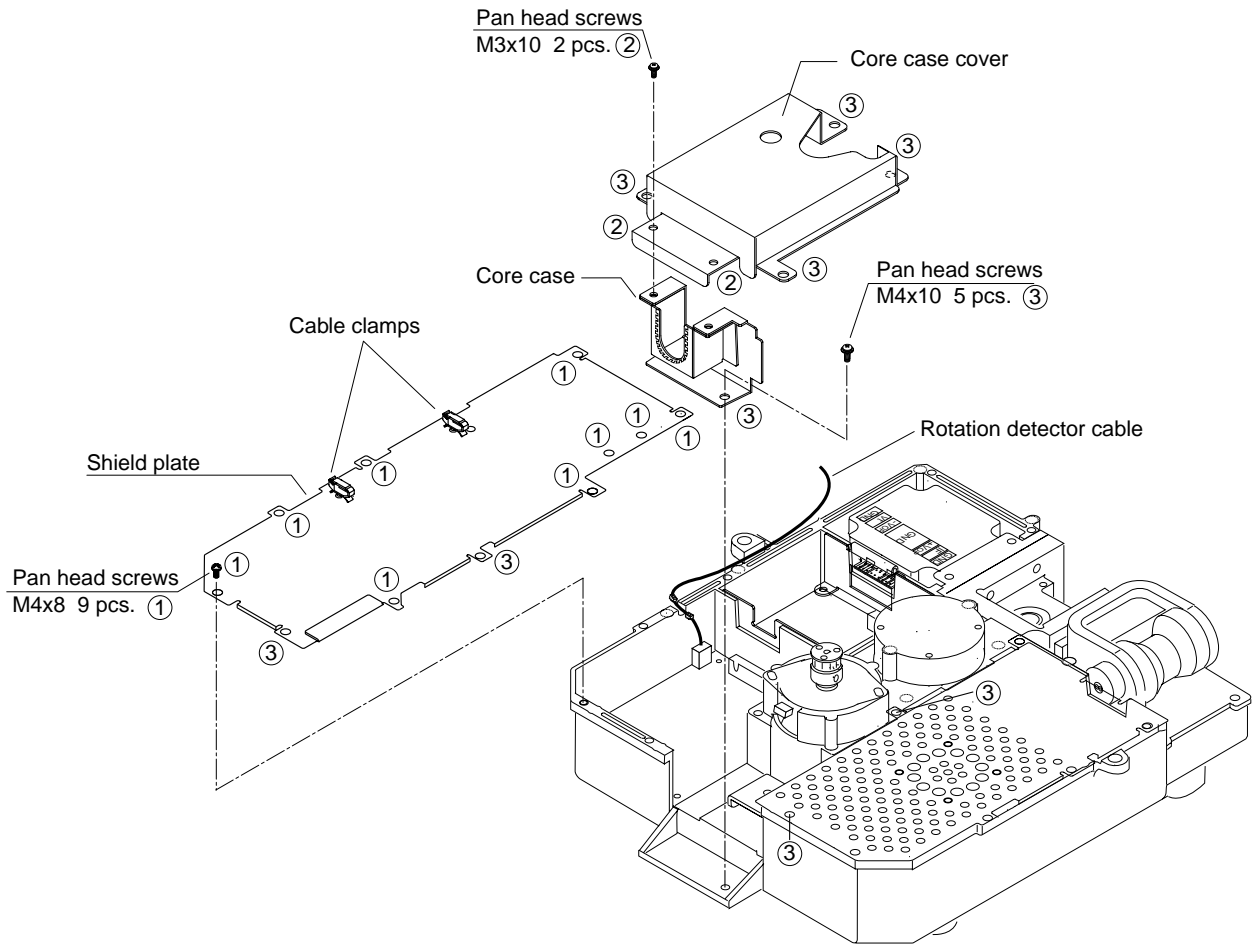


Antenna unit, inside view

4. The mounting base is fitted with a snap holder, which may be used to hang the cover after removal. Use the hole next to screw hole inside the cover to hang it.
 - a) Unfasten the snap assy. with the string attached at the holder in the mounting base.
 - b) Unwind the string.
 - c) Attach the snap to a screw hole on the inside of the cover.

Note: Do not hang any other objects with the snap.

5. Unfasten the rotation detector cable from the cable clamps.
6. Unfasten 16 screws (①, ② and ③ in the following figure) to dismount the shield plate, core case assy and core case cover.

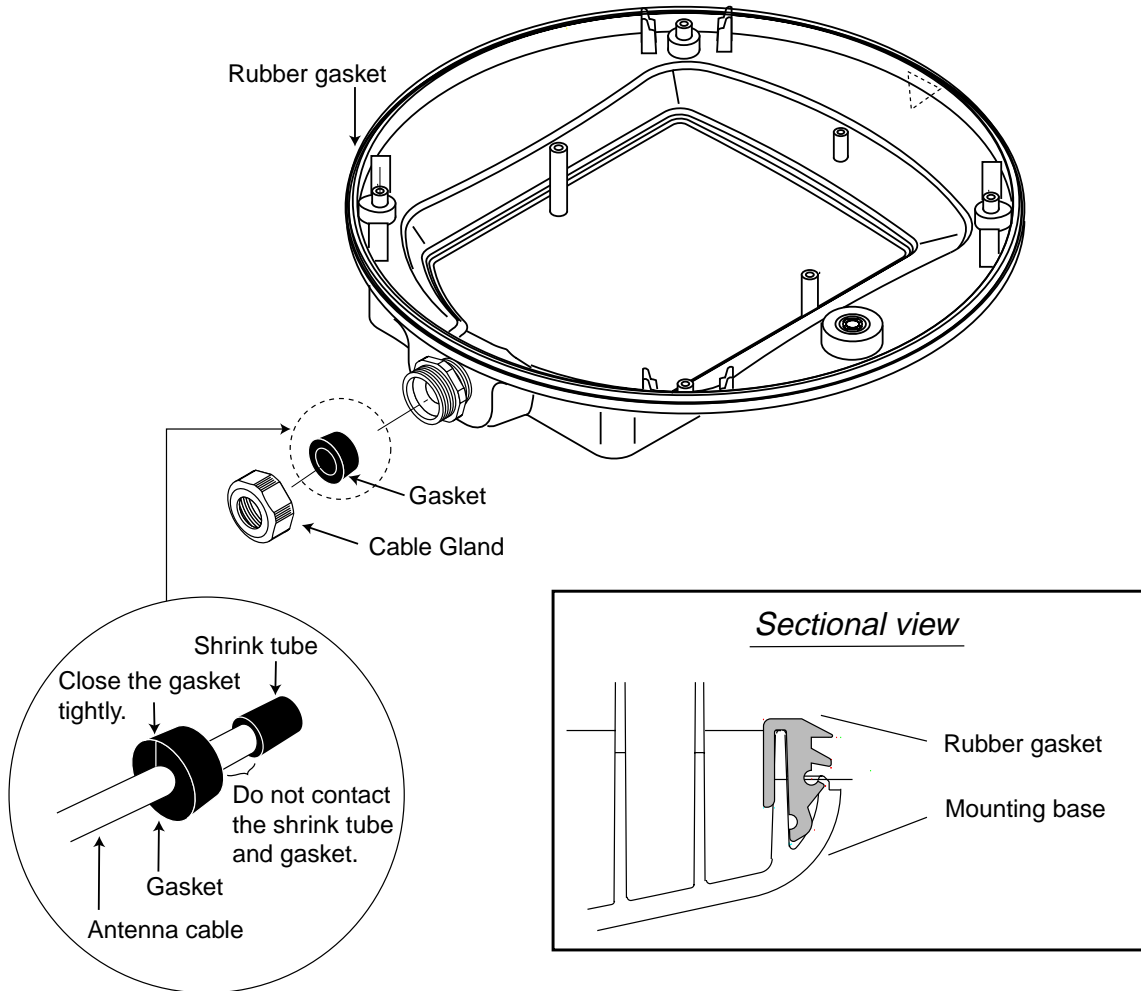


Caution: Be careful not to pinch the rotation detector cable when remounting the shield plate.

- Pass the antenna cable with connector through the cable gland, gasket and cable entrance of the antenna unit, and then tighten cable gland.

Note 1: Be sure the shrink tube on the antenna cable does not contact to the gasket.

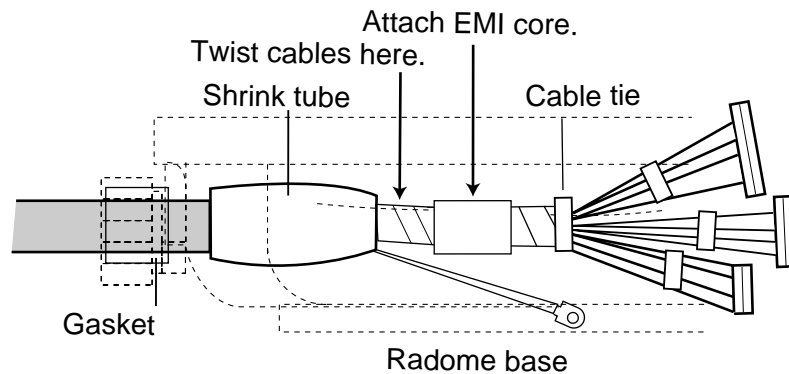
Note 2: Close the gasket tightly to insert into the cable entrance. Confirm that there is no space between both ends of the gasket after inserting into the cable entrance.



Antenna unit, inside view

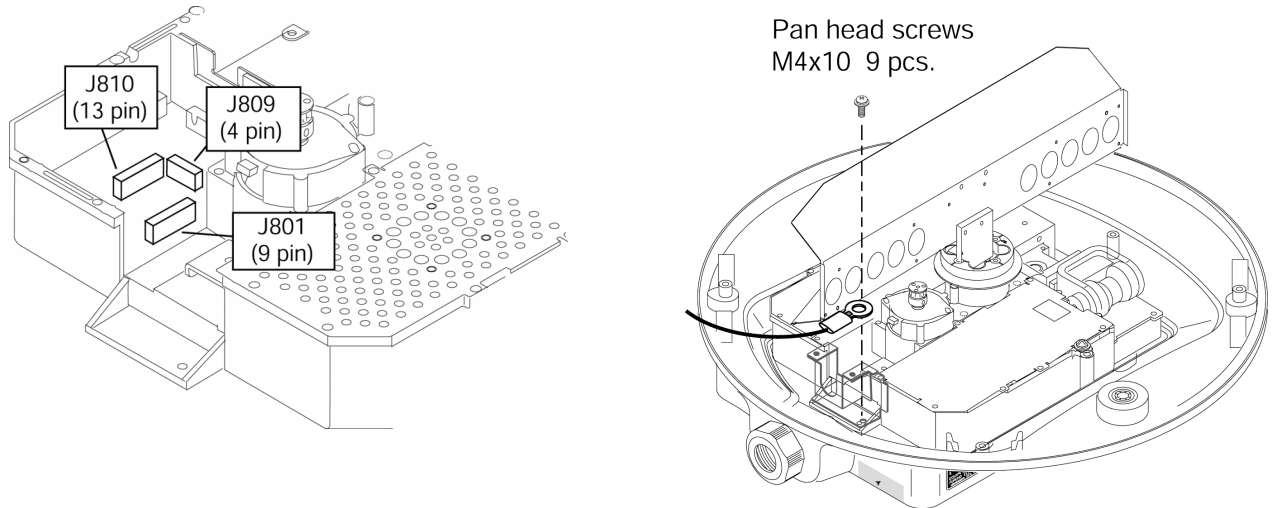
- Twist antenna connector cables at the position between the shrink tube and the cable tie, and then attach EMI core (supplied) to cables as follows.

After attachment, shift EMI core slightly to confirm that it does not pinch cables.



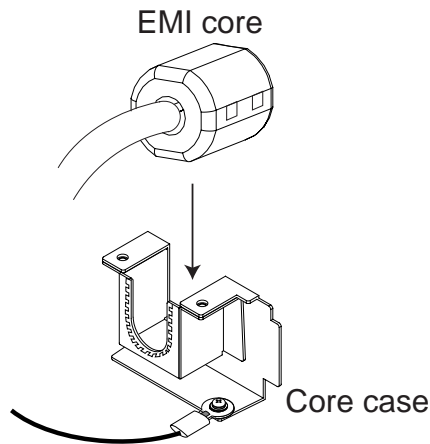
Location of EMI core

9. Attach connectors of the antenna cable as appropriate, and then fasten a pan head screw M4x10 to fix shield cable and core case (removed at step 6.)



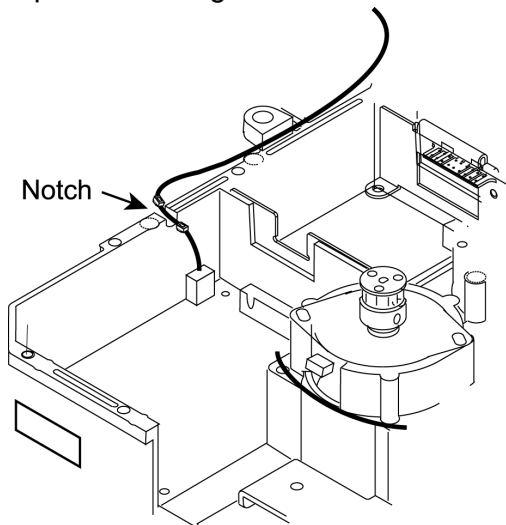
Antenna unit, connector location and fixing the shield cable w/core case

10. Put EMI core on antenna cable into the core case attached at step 9.
A flat side of core should be faced downward.



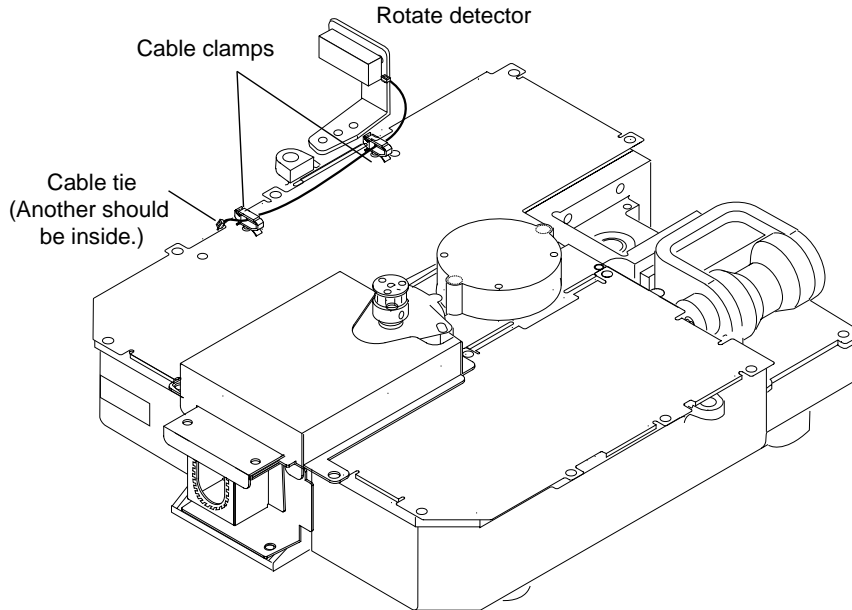
EMI core, putting into core case

11. Refasten the shield plate and core case cover with 15 screws. Be sure that the cable from the rotation detector passes through the notch between the two cable ties.



How to pass the rotation detector cable

12. Pass the cable from the rotation detector through two cable clamps.



Antenna unit, clamping the rotation detector cable

13. Follow the instructions on the label inside the mounting base to secure the snap assy.

14. Confirm that the rubber gasket is properly positioned and that the triangle mark on the radome cover is aligned with the triangle mark on the mounting base, then tighten the fixing screws for the cover. Refer to the figure of sectional view on the previous page for positioning of rubber gasket.

1.5.2 Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit to a mast on a sailboat is optionally available.

Mounting bracket 2

Type: OP03-93

Code No.: 008-445-080

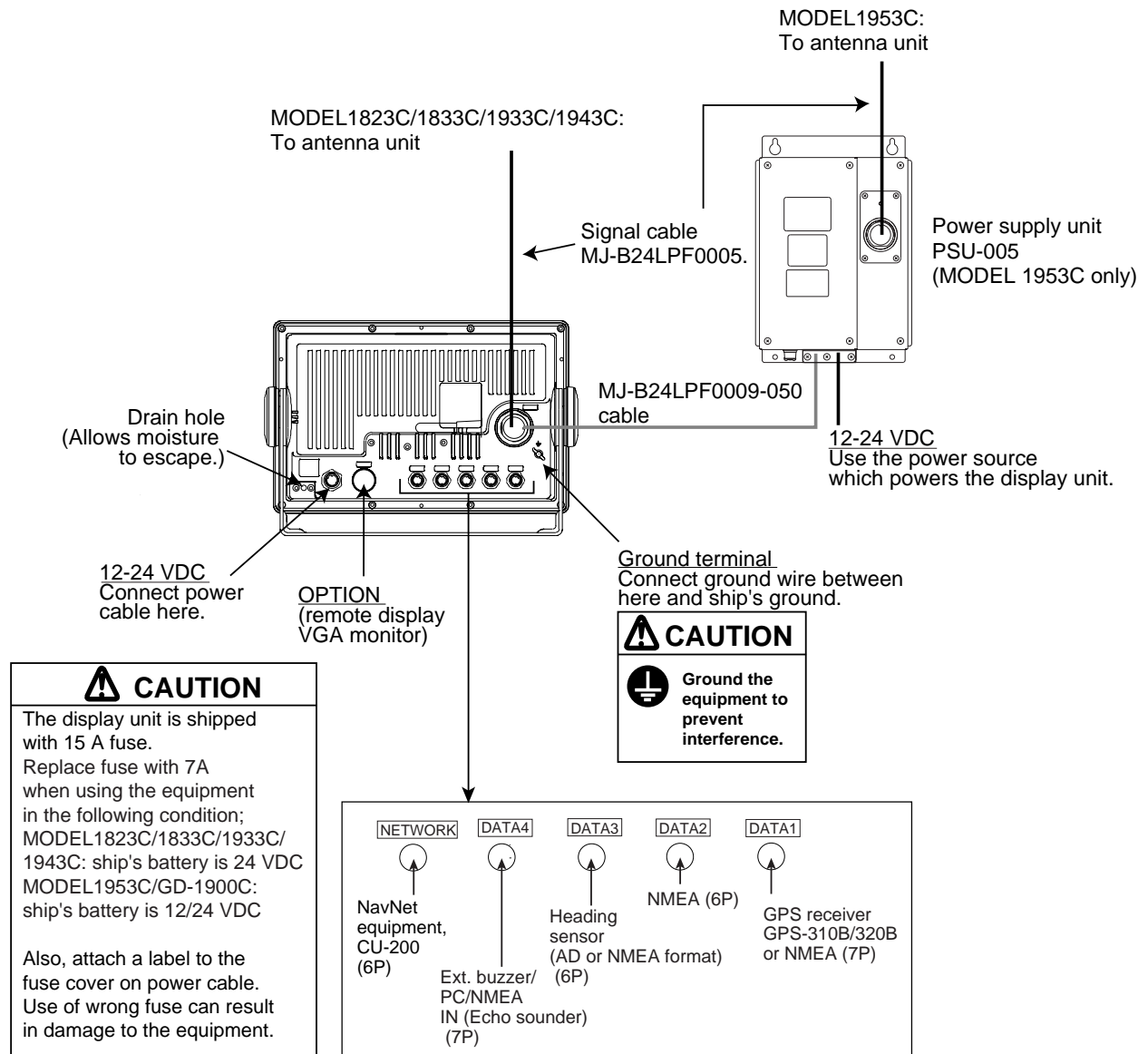
	Type	Code No.	Qty
Hex. bolt	M4x12	000-804-725	4
Hex. bolt	M8x20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-028-9101-0	100-206-810	1
Bracket (2)	03-028-9102-0	100-206-820	1
Fixing plate	03-028-9103-0	100-206-830	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket. For detail, see the figure shown on page 1-10.

2. WIRING

2.1 Standard Wiring

All wiring are terminated at the rear of the display unit.



Display unit, rear view

12-24 VDC

Connect the power cable to the POWER connector at the back of the display unit.

DJ-1

For MODEL1823C/1833C/1933C/1943C/1953C, remove the waterproofing cap from DJ-1 port and discard it.

MODEL1823C/1833C:

Connect the MJ-B24LPF0002 cable from the antenna unit to this port.

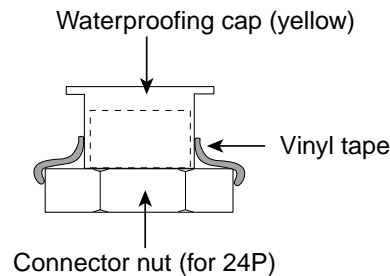
MODEL1933C/1943C/1953C:

Connect the MJ-B24LPF0005 cable from the power supply unit to this port.

GD-1900C:

Do not remove the waterproofing cap.

Wrap the connector nut and cap with vinyl tape as shown below.



Waterproofing cap and connector nut, sectional view

Ground terminal

Connect the ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

DATA1 to DATA4

Other equipments can be connected here as shown below.

DATA1 (7P)	DATA2 (6P)	DATA3 (6P)	DATA4 (7P)
GPS receiver GP-310B/320B	NMEA sentence (ex. Navaid)	Heading sensor (ex. SC-60/120) (MODEL series only)	External buzzer, PC, NMEA IN (Echo sounder)

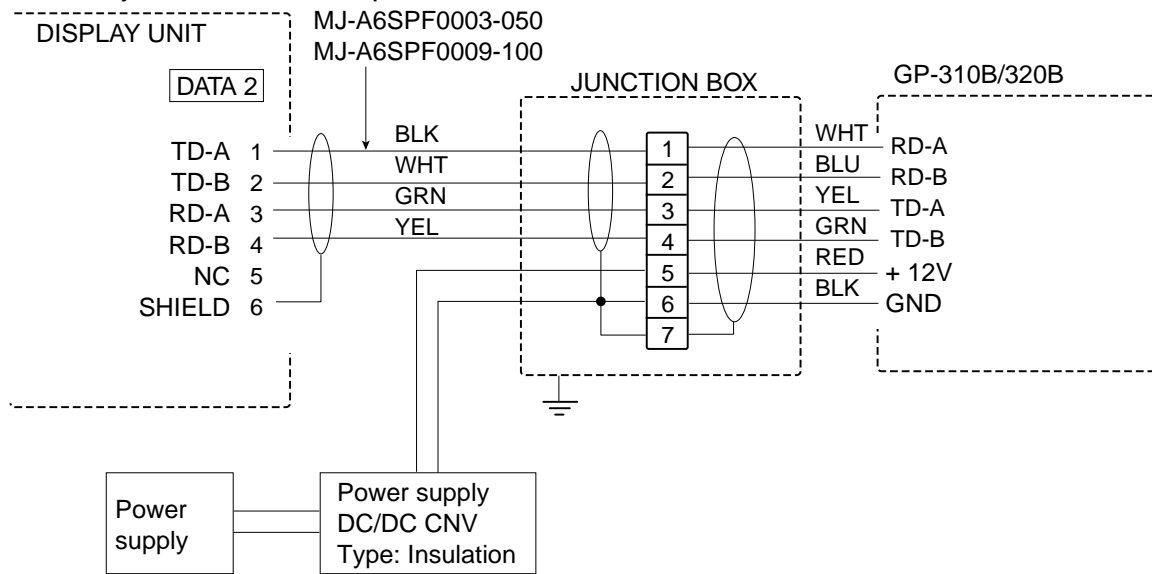
This equipment can receive the following NMEA 0183 format sentence from other equipments.

- Own ship's position: GGA>RMC>RMA>GLL
- Ship's speed: RMC>RMA>VTG>VHW
- Insight satellite information: GSV
- Heading (True): HDT>HDG>HDM
- Course: RMC>RMA>VTG
- Depth: DPT>DBT
- Temperature: MTW
- Time: ZDA
- Other ship's information: TTM
- Wind speed and angle: MWV>VWT/VWR

You will need the optional NMEA cable to connect with other equipments (E/S, navaid, etc.).

Connecting GP-310B/320B to DATA 2 port

When an equipment is connected to DATA 1 port, GPS receiver GP-310B/320B can be connected to DATA 2 port as shown below. You need a junction box and optional cable MJ-A6SPF0003-050 or MJ-A6SPF0009-100.



Connecting GP-310B/320B to DATA 2 port

NETWORK port

Other NavNet equipment should be connected to this port with the optional MJ-A6SPF0014 cable. Available equipments are shown below.

Radar	Plotter	Network sounder	Other
MODEL1722/1732/ 1742/1762/1722C/ 1732C/1742C/1762C/ 1752C/1823C/1833/ 1933/1943/1833C/ 1933C/1943C/1953C	GD-1700/1700C/1900C	ETR-6/10N ETR-30N	HUB (used when more than two NavNet units are connected.)

2.2 External Buzzer (OP03-136, option) Connection

The optional external buzzer provides a louder alert when the alarm is violated.

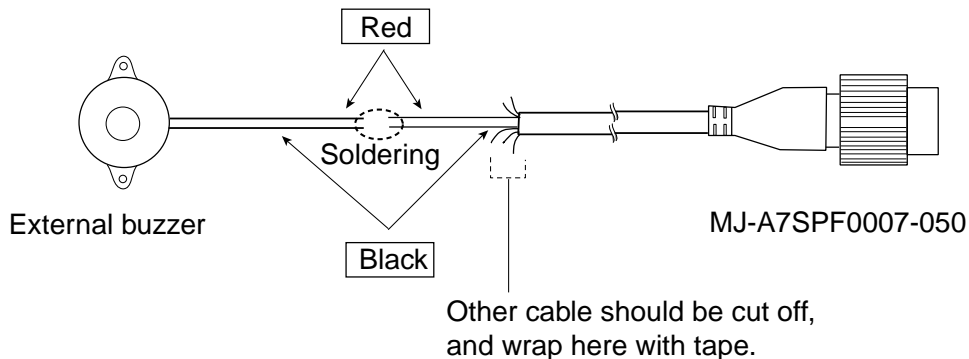
External buzzer

Type: OP03-136

Code no.: 000-086-443

Further, you need the optional cable assy MJ-A7SPF0007-050 (w/7P connector, 5 m, code no. 000-144-418).

1. Attach the MJ-A7SPF0007-050 cable assy (option) to the DATA 4 port at the rear of the display unit.
2. Cut the XH connector at the end of the external buzzer cable with appropriate length.
3. Solder the cables made at step 2 with MJ-A7SPF0007-050 cable as shown below.

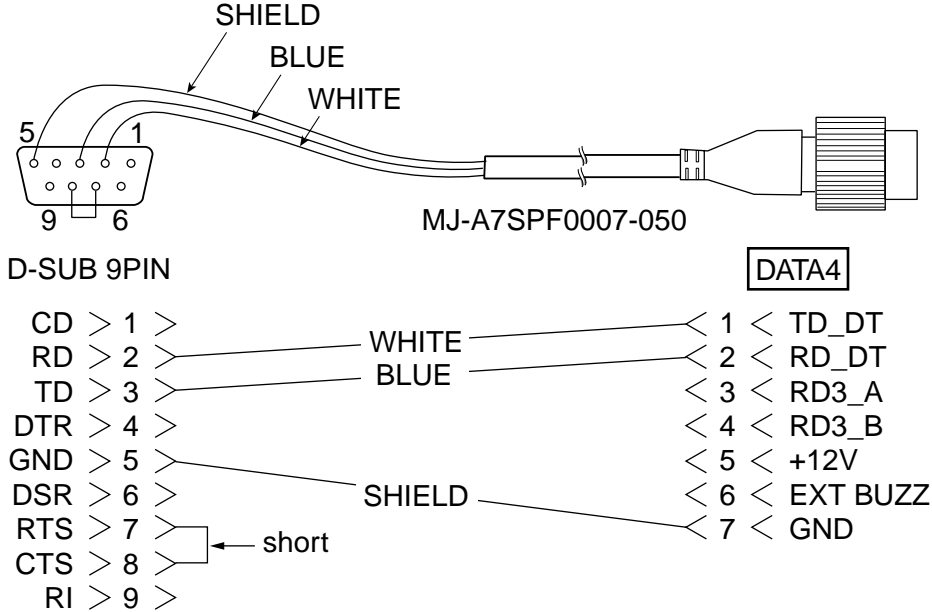


*Connection of external buzzer and display unit
using cable assy type MJ-A7SPF0007-050 cable*

4. Fasten the buzzer with the double-sided tape or two tapping screws (3x15 or 3x20, local supply).

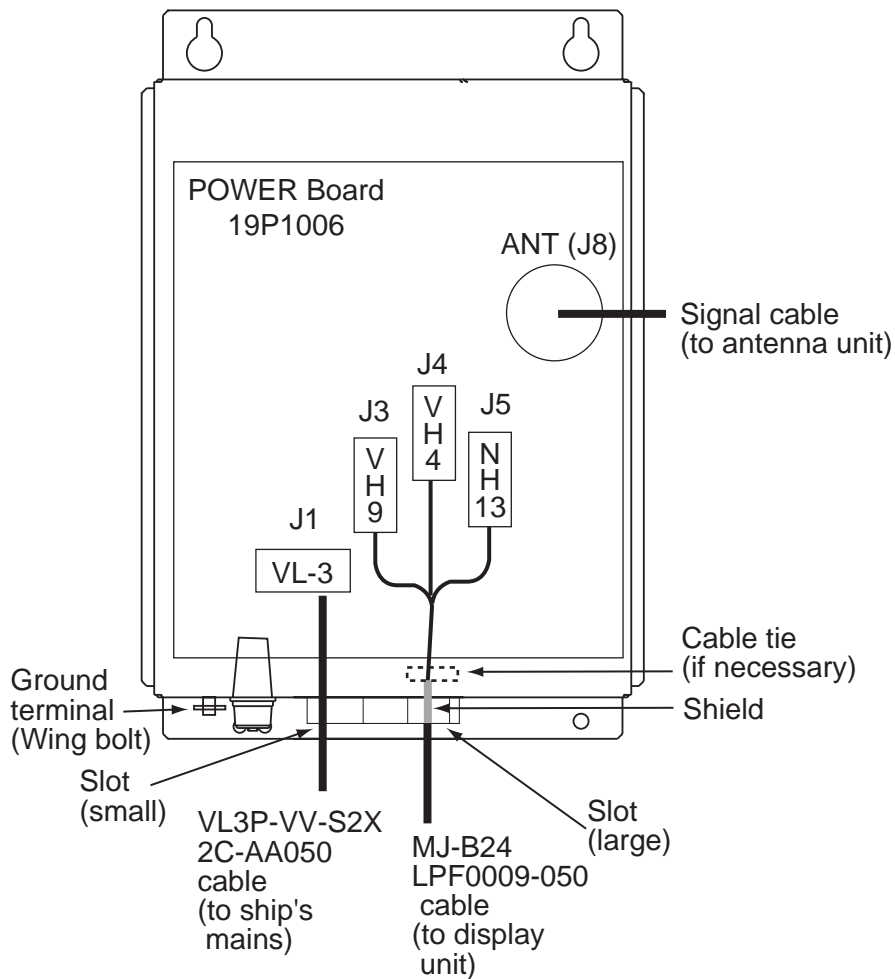
2.3 How to Connect with PC

When connecting with the personal computer, prepare the optional cable assy MJ-A7SPF0007-050 and D-sub 9 pins plug (local supply), and connect them as follows.



2.4 Wiring of Power Supply Unit (MODEL1953C only)

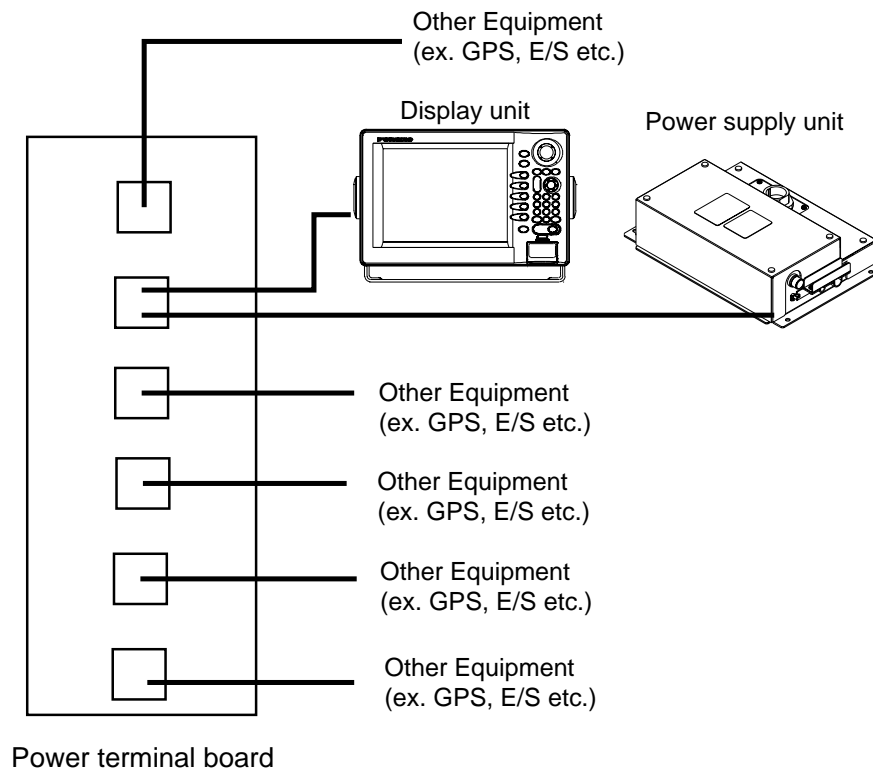
1. Loosen three M4 screws to remove the cable clamp.
2. Loosen six M4 screws to remove the unit cover.
3. Attach the VL connector of power supply cable VL3P-VV-S2X2C-AA050 (supplied as installation material) to J1 on the POWER Board.
4. Attach the VH and NH connectors of MJ-B24LPF0009-050 cable (supplied as installation material) to the locations appropriately; VH9: J3, VH4: J4, NH13: J5.




Power supply unit, cover removed

5. Lay two cables on the slots referring the figure in the above.
When MJ-B24LPF0009-050 cable has a tension, fasten the cable tie (local supply) to the position shown above to avoid pulling the cable off.
6. Reattach the unit cover (removed at step 2).
7. Reattach the cable clamp (removed at step 1) to fix two cables.
8. Connect the signal cable to ANT port on the power supply unit.
9. Connect the ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

Note: The power for the power supply unit and display unit must be drawn from the same power switch on the power terminal board.



 CAUTION
<p>The display unit and antenna should be powered from the same power source. This should be done so the antenna will rotate only when the display unit is turned on.</p>

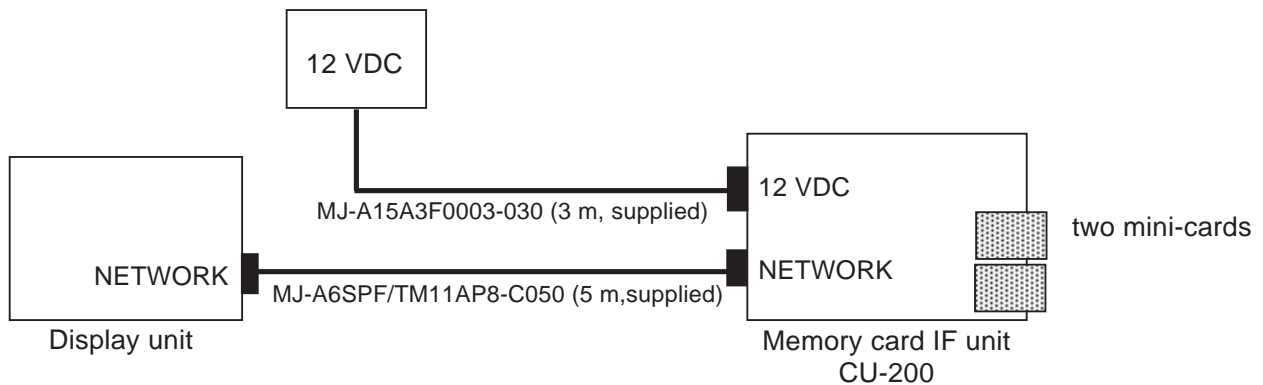
Replacement of the fuse

The power supply unit is shipped with 15 A fuse. Replace fuse with 7 A (supplied) when the ship's battery is 24 VDC. Note that replace fuse of the display unit with 7 A when the ship's battery is 24 VDC.

2.5 Connection of CU-200 (option)

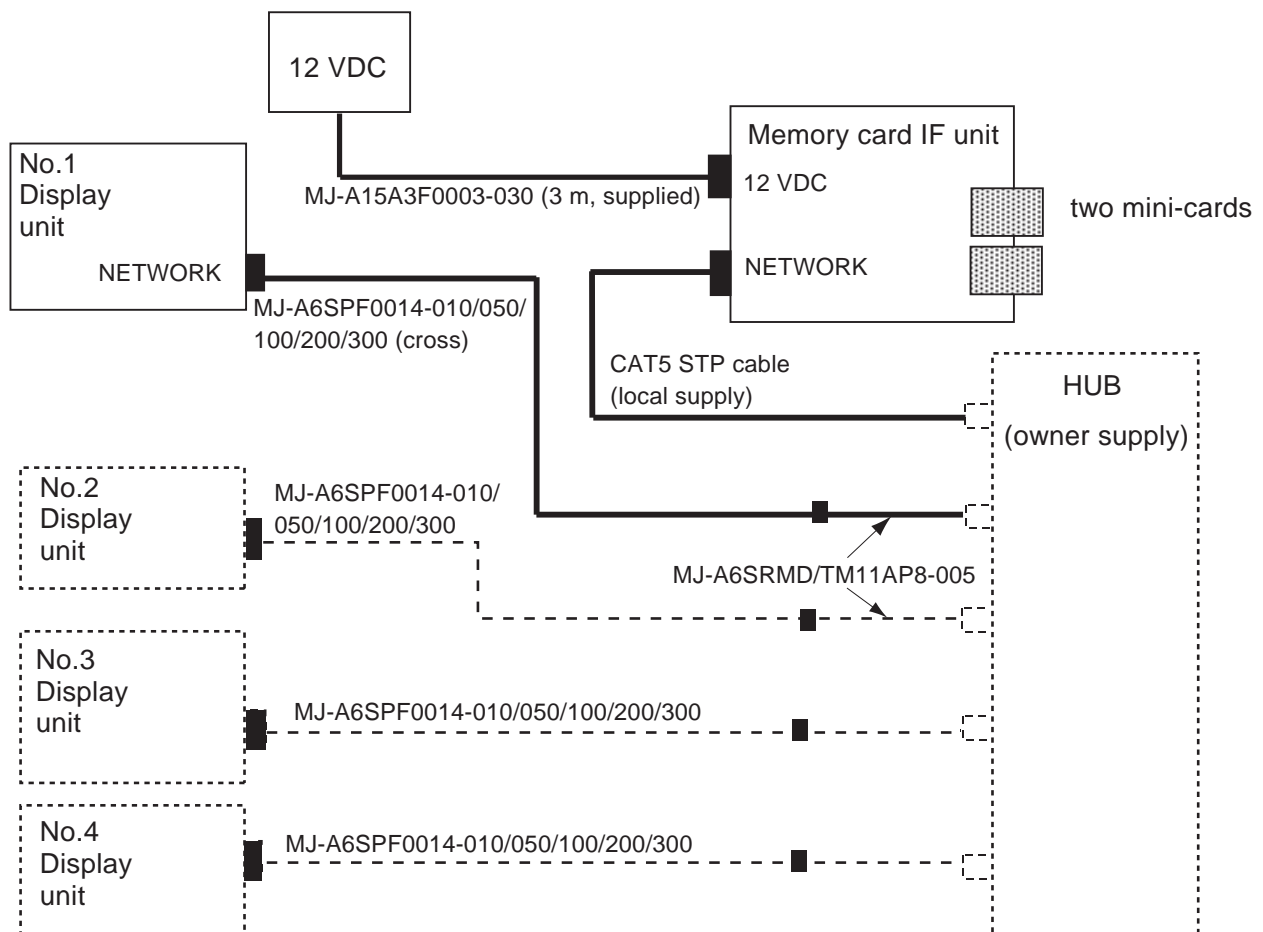
1) Connection between one display unit and one memory card IF unit

Connect as shown in the figure below.



2) Connection between one memory card IF unit and multiple processor units

Prepare optional cable MJ-A6SPF0014-010/050/100/200/300 (1, 5, 10, 20 or 30 m) and MJ-A6SRM-D/TM 11AP8-005. Also, procure HUB and CAT5 STP cable locally. Connect as shown in the figure below.

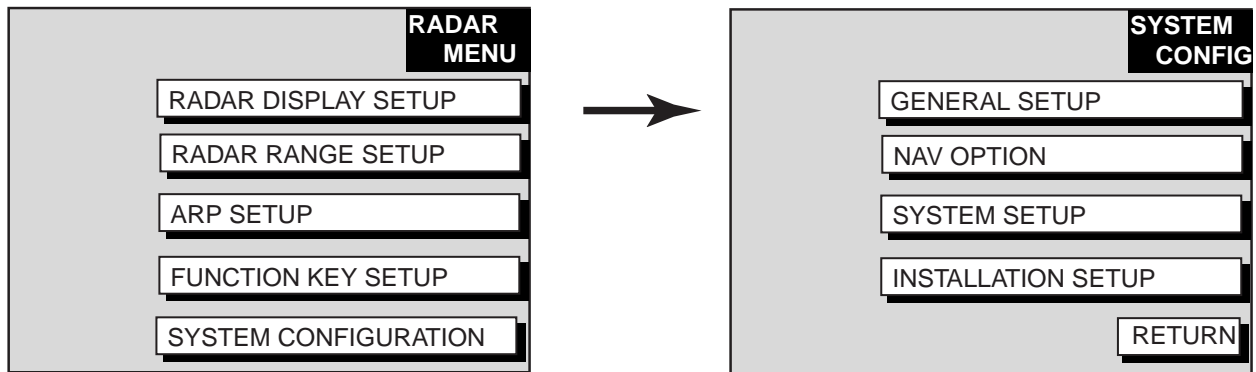


3. ADJUSTMENT

3.1 How to Access to Installation Menu

You should do the set up for the equipment through the installation menu when installation has been finished. To access to the installation menu, follow the steps in below.

1. With the display powered off, hold down the [MENU] key. Then, momentarily press the [POWER/TX] key while continuing to hold the [MENU] key down. You may release the [MENU] key when a blue start-up screen appears.
2. Release the [MENU] key when the message of "STARTING INSTALLATION MODE" appears.
3. After the radar screen appears, press the [MENU] key to show the RADAR MENU.
4. Press the SYSTEM CONFIGURATION soft key to show the SYSTEM CONFIG menu.

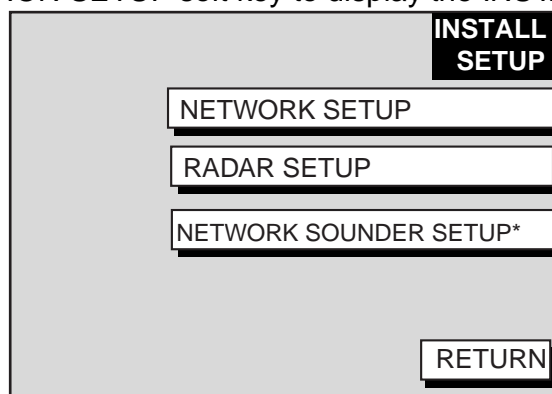


Radar menu
(Ex. MODEL1833C/1933C/1943C/1953C)

System configuration menu

How to access the Installation menu

5. Press the INSTALLATION SETUP soft key to display the INSTALL SETUP menu.



*: Do not change this item setting.

Installation setup menu

3.2 NETWORK SETUP Menu

To communicate with other NavNet equipment, this setting should be done.

1. Open the INSTALL SETUP menu.
2. Press the NETWORK SETUP soft key.

		NETWORK SETUP
▶ IP ADDRESS	172.031.003.003	EDIT
HOST NAME	RADAR_____	
RADAR SOURCE	RADAR_____	RETURN
CHART SOURCE*	_____ -1	
	_____ -1	
	_____ -1	
SOUNDER SOURCE	SOUNDER_____	
AUX SOURCE	WXFAX_____	
SUBNET MASK	255.255.000.000	
GATEWAY ADDRESS	000.000.000.000	
OFFSET PORT NUMBER	10000	

NETWORK SETUP menu

3. Select menu option and press the EDIT soft key or [ENTER] knob. For example, select HOST NAME.

HOST NAME
RADAR_____

Host name window

4. Use the trackball to select location and press the alphanumeric keys to set character (or value).
5. Press the [ENTER] knob or ENTER soft key to finish.
6. Repeat steps 3-5 for other items.
7. Press the [MENU] key to finish.

*: For the CHART SOURCE setting, the card drive 1 or 2 on the optional CU-200 can be selected by the 1/2 soft key. "-1" or "-2" is also displayed for other device (for example, RADAR-1 or PLOTTER-1), but these numbers may be ignored.

Contents of Network setup menu

Item	Description	Default Setting
IP ADDRESS	This address is assigned at the factory. Change the address (last three digits; 001 to 254) when like models are connected directly or through the hub. Do this change before connecting the equipment to the other equipment or hub to distinguish. Do not set the same IP address in the network.	Radar: 172.031.003.003
HOST NAME	Set the name for your display unit to distinguish it from others in the NavNet system. Confirm that two equipment don't have same host names. The host name has been preset depending on the series of NavNet. See the table in below. This host name is used for RADAR SOURCE and CHART SOURCE.	MODEL series: RADAR
		GD-1900C: PLOTTER
RADAR SOURCE	Enter the host name "RADAR (preset)" or the new name set at HOST NAME item setting if the unit has been changed of the network radar to use for the radar display. Clear the RADAR SOURCE name when your equipment is GD-1900C and no radar is connected.	RADAR
CHART SOURCE	Enter a host name (set at HOST NAME) of network display unit to select equipment which has chart card in its slot (Max. three units) to use. The driver names of the memory card interface unit (option) are MCDRIVE-1 (left side) and MCDRIVE-2 (right side).	None
SOUNDER SOURCE	The host name of the network sounder ETR-6/10N or ETR-30N is preset (SOUNDER) to use for the video sounder display. Clear the host name when no network sounder is connected.	SOUNDER
AUX SOURCE	For the facsimile receiver FAX-30. Use the default setting.	WX FAX
SUBNET MASK	Not used. Reserved for future use.	255.255.000.000
GATEWAY ADDRESS		000.000.000.000
OFFSET PORT NUMBER		10000

NavNet equipment default settings

Model	IP ADDRESS	HOST NAME
MODEL1722/1732/1742/1762	172.031.003.004	RADAR
MODEL1722C/1732C/1742C/1762C/1752C	172.031.003.001	RADAR
MODEL1833/1933/1943	172.031.003.002	RADAR
MODEL1823C/1833C/1933C/1943C/1953C	172.031.003.003	RADAR
GD-1700/1700C	172.031.014.001	PLOTTER
GD-1900C	172.031.003.003	PLOTTER
CU-200	172.031.014.100	MCDRIVE

3.3 RADAR SETUP Menu

After the network setup, do the following in order to adjust the radar.
 Open the INSTALL SETUP menu, and then press the RADAR SETUP soft key to display the RADAR SETUP menu. When the message of “RADAR DOES NOT TRANSMIT. TRANSMIT RADAR?” appears, press the [ENTER] knob to transmit or [CLEAR] key to cancel transmitting.

		RADAR SETUP
▶ ANTENNA TYPE	F	EDIT
HEADING DATA	MAGNETIC	
ANTENNA ROTATION	ROTATE*	NEXT PAGE
TUNING	OFF	
TIMING ADJUST	OFF	RETURN
VIDEO ADJUST	OFF	
M.B. SUPPRESSION	OFF	
RADAR ANTENNA HEIGHT	HIGH	
STC CURVE	NARROW	
MONITOR MODE	OFF	

*: Do not change this item setting (excluding 1953C).

Page 1

		RADAR SETUP
▶ HEADING ADJUST	OFF	EDIT
TOTAL ON TIME	000000.0 h	
TOTAL TX TIME	000000.0 h	PREV. PAGE

Page 2

Radar setup menu

3.3.1 ANTENNA TYPE

Select the antenna type connecting with your display unit. Default setting is “F”.
Select the antenna type referring to the table shown below.
After selection, press the [ENTER] knob or ENTER soft key.

Your unit	Setting
MODEL1823C	A
MODEL1833C	B
MODEL1933C	F
MODEL1943C	G
MODEL1953C	H

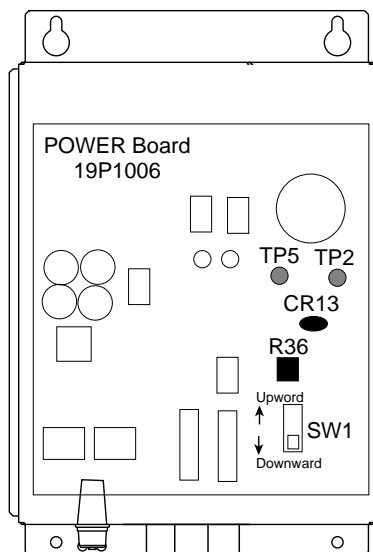
3.3.2 TUNING

MODEL 1953C: Go to “Tuning for 1953C power supply unit”, and then “Antenna tuning”
Other models: Go to “Antenna tuning”.

Tuning for 1953C power supply unit

For MODEL 1953C, first of all tune the power supply unit to adjust the point of tuning indicator.

1. Open the power supply unit cover.
2. On the RADAR SETUP menu, select STOP at ANTENNA ROTATION.
3. Close the menu, and then transmit the radar with the range more than 6 nm.
4. Flip the SW1 on the POWER Board to upward (for tuning position).
5. Adjust R36 potentiometer clockwise so that CR13 LED lights in the highest brilliance.
Also adjust R36 so that the voltage becomes the largest by using a multimeter. (TP5: +, TP2: -)
6. Flip the SW1 to downward (normal position, default setting).
7. Reassemble the power supply unit.
8. Go to the “Antenna tuning” on the next page.

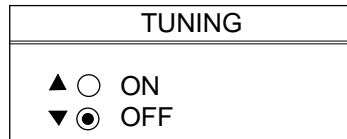


Power supply unit, cover removed

Antenna tuning

Initialize the tuning as follows.

1. Transmit the radar.
2. Open the RADAR SETUP menu, and then select TUNING by the trackball or [ENTER] knob.
3. Press the EDIT soft key or [ENTER] knob to show the setting window.



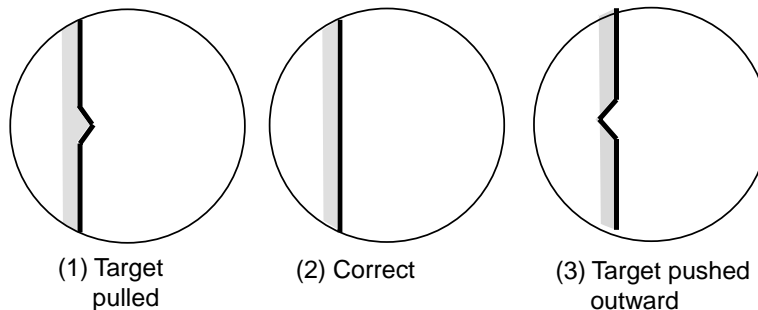
Tuning setup menu

4. Select ON.
5. Press the [ENTER] knob or ENTER soft key to start the auto tuning.
6. After the adjustment is completed, the message of "NOW TUNING" disappears.
7. Return to the menu display automatically.

3.3.3 TIMING ADJUST

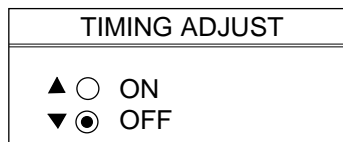
This adjustment ensures proper radar performance, especially on short ranges. The radar measures the time required for a transmitted echo to travel to the target and return to the source. The received echo appears on the display based on this time. Thus, at the instant the transmitter is fired, the sweep should start from the center of the display (sometimes called sweep origin.)

A trigger pulse generated in the display unit goes to the antenna unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the antenna unit varies, depending largely on the length of signal cable. During this period the display unit should wait before starting the sweep. When the display unit is not adjusted correctly, the echoes from a straight local object (for example, a harbor wall or straight pier) will not appear with straight edges – namely, they will be seen as “pushed out” or “pulled in” near the picture center. The range of objects will also be incorrectly shown.



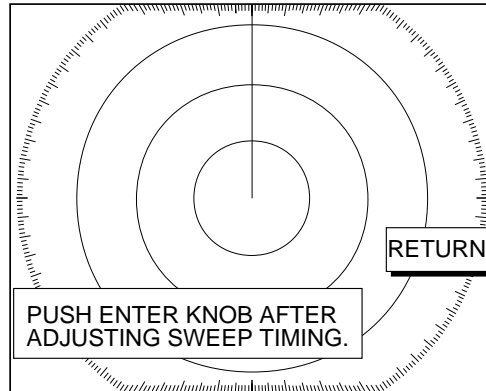
Examples of improper and correct sweep timing

1. Transmit on the shortest range and confirm that gain and A/C SEA are properly adjusted.
2. Visually select a target which forms straight line (harbor wall, straight piers).
3. Open the RADAR SETUP menu and select TIMING ADJUST.
4. Press the EDIT key or [ENTER] key to show the setting window.



Timing adjust setting menu

5. Select ON and press the [ENTER] knob or ENTER soft key to show the radar display.



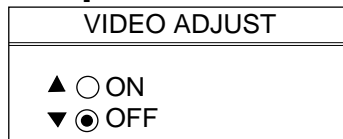
Timing adjustment setting display

6. Rotate the [ENTER] knob to straighten the target selected at step 2, and then press the RETURN soft key to finish.

3.3.4 VIDEO ADJUSTMENT

Adjusts video amplifier input level.

1. Open the RADAR SETUP menu and select VIDEO ADJUST by the trackball or [ENTER] knob.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



Video adjustment setting window

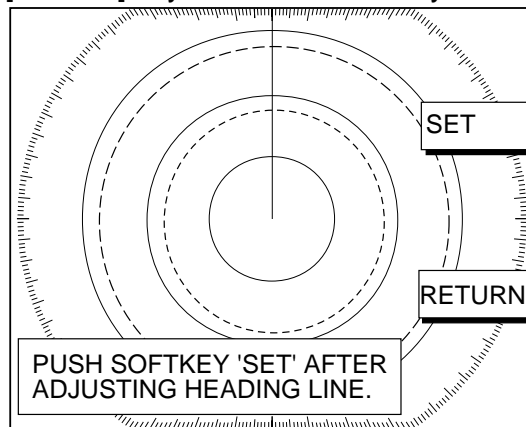
3. Select ON.
4. Press the [ENTER] key or ENTER soft key to start video adjustment.
5. When adjustment is completed, the message of "NOW ADJUSTING VIDEO" disappears, and return to the menu display automatically.

3.3.5 HEADING ADJUST

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.

1. Set ship's heading toward a suitable target (for example, ship or buoy) at a range between 0.125 and 0.25 nautical mile.
2. Open the RADAR SETUP menu, and press the NEXT PAGE soft key.
3. Select HEADING ADJUST and press the EDIT soft key or [ENTER] knob to show the HEADING ADJUST window.
4. Select ON followed by [ENTER] key or ENTER soft key to show the radar display.



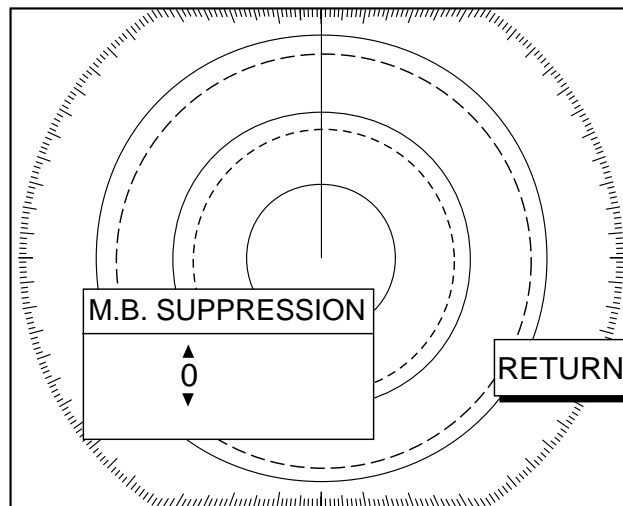
Heading adjustment setting display

5. Rotate the [ENTER] knob to bisect the target with the EBL.
6. Press the SET soft key.
7. As a final test, move the boat towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

3.3.6 M. B. (Main Bang) SUPPRESSION

Main bang (black hole), which appears at the display center on short ranges, can suppressed as follows.

1. Open the RADAR SETUP menu and select M.B. SUPPRESSION by trackball or [ENTER] knob.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.
3. Select ON.
4. Press the [ENTER] knob or ENTER soft key to start the adjustment.



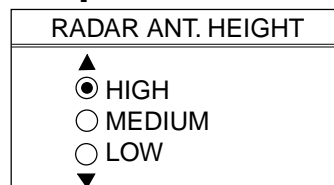
Main bang suppression setting window

5. Rotate the [ENTER] knob to suppress main bang (between 0 and 25).
6. Press the RETURN soft key.

3.3.7 RADAR ANTENNA HEIGHT

The A/C SEA function respects to antenna height above the waterline. Set antenna height above the waterline to optimize the A/C SEA function.

1. Open the RADAR SETUP menu and select RADAR ANTENNA HEIGHT.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



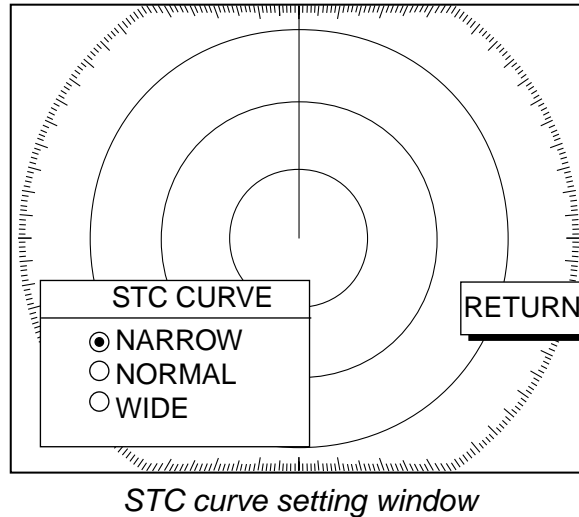
Radar antenna height setting window

3. Select antenna height above the waterline; HIGH (6-10 m), MEDIUM (3-6 m) or LOW (0-3 m). The default setting is MEDIUM.
4. Press the [ENTER] key or ENTER soft key to finish.

3.3.8 STC CURVE

The default STC curve can be maintained in most cases. If necessary the STC curve can be changed as follows:

1. Open the RADAR SETUP menu and select STC CURVE.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



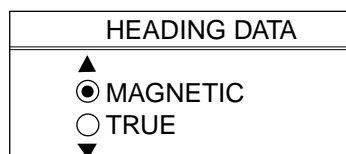
3. Select STC curve;
 - NARROW: The effective range of the [A/C SEA] adjustment is relatively short.
 - NORMAL: Between NARROW and WIDE.
 - WIDE: The effective range of the [A/C SEA] adjustment is relatively long.
4. Press the RETURN soft key to finish.

3.3.9 HEADING DATA

Select the heading reference, MAGNETIC or TRUE. Select MAGNETIC when connecting with the magnetic compass, select TRUE when connecting with the true compass. For your reference, when connecting with Satellite Compass SC-60/120 or Integrated Heading Sensor PG-1000 which Furuno makes, set the heading data as the table shown below.

Model		Setting of HEADING DATA
PG-1000	with L/L data	TRUE
	w/o L/L data	MAGNETIC
SC-60/120		TRUE

1. Open the RADAR SETUP menu and then select HEADING DATA.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



Heading data setting window

3. Select MAGNETIC or TRUE.
4. Press the [ENTER] knob or ENTER soft key.

3.4 Checking Magnetron Heater Voltage

Note: This confirmation/adjustment should only be performed by a qualified service technician.

Magnetron heater voltage is formed on the PTU (1833C)/MD (1823C/1933C/1943C/1953C) Board of the antenna unit, and preadjusted at the factory. Therefore no adjustment is required. However, check magnetron heater voltage for confirmation as follows:

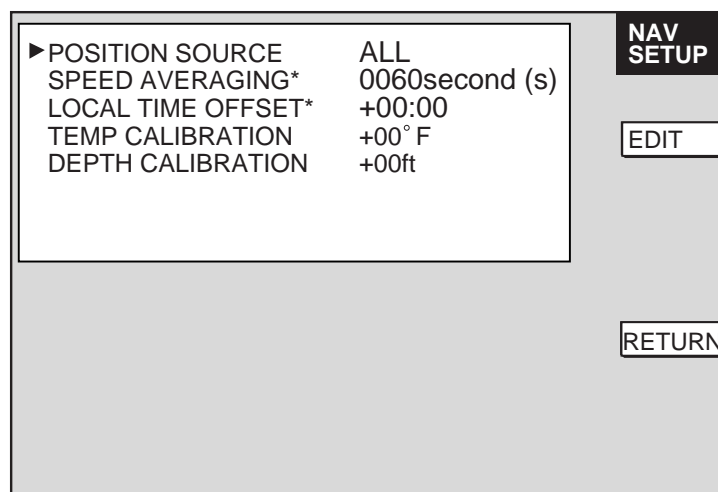
1. Open the antenna unit.
2. Turn on the power. Do not transmit the radar.
3. Connect a multimeter, set to 10VDC range, appropriate position on the MD (1823C), PTU (1833C) or RTB (1933C/1943C/1953C) Board in the antenna unit. Refer to the table in below.
4. Confirm that the multimeter indication is appropriately.

	MODEL1823C	MODEL1833C	MODEL1933C/1943C/1953C
Check point	TP804#6 (+) and #4 (-) on MD Board	TP802#4 (+) and #6 (-) on PTU Board	J825#4 and #6 (GND) on RTB Board
Multimeter indication	7.9 to 8.1 V	7.4 to 7.6 V	7.4 to 7.6 V
Adjustment point	VR801 on MD Board	R106 on PTU Board	VR801 on MD Board

3.5 Navigation Data Source

The NAV SOURCE SETTINGS menu mainly selects the source of nav data. For navigator other than the FURUNO GP-310B/320B, speed averaging and local time offset (to use local time instead of UTC time) are also available from this menu.

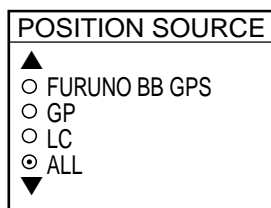
1. Press the [MENU] key followed by SYSTEM CONFIGURATION, NAV OPTION and NAV SOURCE SETTINGS soft keys to show the NAV SETUP menu.



* For GPS receiver other than GP-310B/320B.

Nav setup menu

2. Select POSITION SOURCE and press the [EDIT] key or [ENTER] knob to show the position source window.



3. Select FURUNO BB GPS, GP, LC or ALL as appropriate and press the [ENTER] knob or ENTER soft key.
FURUNO BB GPS: GPS Receiver GP-310B/320B
GP: GPS navigator (via NETWORK or DATA 1, DATA2 connector)
LC: Loran C (via NETWORK or DATA 1, DATA 2 connector)
ALL: Multiple navaid connection (via NETWORK or DATA 1, DATA 2 connector)
4. **For GPS receiver other than the GP-310B/320B**, you may adjust speed averaging and use local time.
 - a) Choose desired item and press the EDIT soft key.
 - b) Use the trackball to select location and rotate the [ENTER] knob to set value. For time, use the +< -> - soft key to switch from plus to minus and vice versa.
 - c) Press the [ENTER] key.

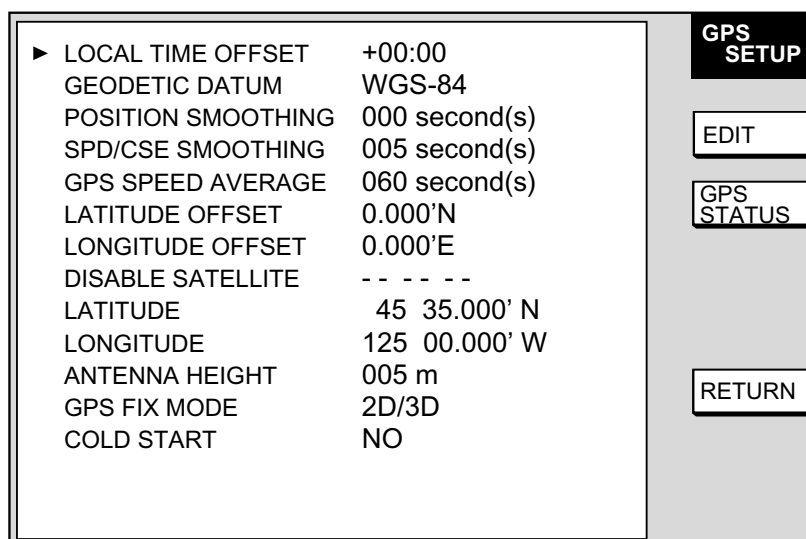
Speed Averaging: Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting, 60 seconds, is suitable for most conditions. The range of adjustment is 0-9999 (sec).

Local Time Offset: GPS uses UTC time. If you would rather use local time enter the time difference between it and UTC. The range of offset is -13:30 to + 13:30 and the default setting is zero (no offset). This setting is not necessary if the difference time is entered at the GPS navaid which is connected.

Temp Calibration: Offsets NMEA water temperature data (-40°F to +40°F).

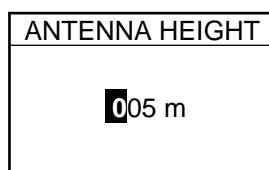
Depth Calibration: Offsets NMEA depth data (-15 ft to +90 ft).

5. **For GP-310B/320B**, press the RETURN soft key twice to show SYSTEM CONFIG menu.
6. Press the SYSTEM SETUP soft key followed by PORT SETUP and GPS/NMEA PORT soft keys. When the GP-310B/320B is connected to the DATA 2 port, press the NMEA PORT soft key.
7. Select FURUNO GPS SENSOR, and press the [ENTER] knob or EDIT soft key to show FURUNO GPS SENSOR window.
8. Select YES and press the [ENTER] knob or ENTER soft key.
9. Press the RETURN soft key three times followed by NAV OPTIONS, GPS SENSOR SETTINGS soft keys to show the GPS SETUP menu.



GPS setup menu

10. Select LOCAL TIME OFFSET and press the EDIT soft key.
11. Enter time difference between local time and UTC time. Use the + <- - > - soft key to switch from plus to minus and vice versa. And then press the [ENTER] knob or ENTER soft key.
12. Select ANTENNA HEIGHT and press the EDIT soft key.



Antenna height window

13. Enter the height of the GP-310B/320B antenna unit above sea surface. Use the trackball to select digit and press the alphanumeric keys (or rotate the [ENTER] knob) to set value. The default height is 5 m.
14. Press the [ENTER] knob or ENTER soft key.
15. Choose and set other items as appropriate, referring to the table on the next page.

Contents of GPS sensor settings menu

Item	Description	Settings	Default Setting
Local Time Offset	Allows the user to use local time (instead of UTC time). Enter time difference between local time and UTC time. Use the + < - - > - soft key to switch from plus to minus and vice versa.	-13:30 to +13:30 hr	0 hr (no offset)
Geodetic Datum	Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing.	Use the trackball or [ENTER] knob to select appropriate chart.	WGS-84
Position Smoothing	When the DOP or receiving condition is unfavorable, the GPS fix may change, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting shows response time to change in latitude and longitude. This is especially noticeable at high ship' speeds. Increase the setting if the GPS fix changes.	0-999 sec	0 sec (no position smoothing)
Spd/Cse Smoothing	During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeros.	0-999 sec	5 sec
GPS Speed Average	Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds, which is suitable for most conditions.	0-999 sec	60 sec
Latitude Offset	Offsets latitude position to further refine position accuracy. Use the N < - - > S soft key to switch coordinate.	9.999'S – 9.999'N	0.0' (no offset)

(Continued on next page)

Contents of GPS sensor settings menu (con't.)

Item	Description	Settings	Default Setting
Longitude Offset	As above but for longitude. Use the W < - - > E soft key to switch coordinate.	9.999'E – 9.999'W	0.0' (no offset)
Disable Satellite	Every GPS satellite is broadcasting abnormal satellite number (s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key.		None
Latitude	Set initial latitude position after cold start. Use the N < - - > S soft key to switch coordinate.	90°S - 90°N	45°35.000'N
Longitude	Set initial longitude position after cold start. Use the W < - - > E soft key to switch coordinate.	180°E – 180°W	125°00.000'W
Fix Mode	Choose position fixing method: 2D (three satellites in view), 2D/3D (three or four satellites in view whichever is greater).	2D, 2D/3D	2D/3D
Antenna Height	Enter the height of the GPS antenna unit above sea surface.	0-99 m	5 m
Cold Start	Clears the Almanac to receive the latest Almanac.	No, Yes	No
GPS STATUS (soft key)	Displays GPS satellite status display.		

3.6 Setting up Data Ports

Setup the data ports according to the equipment connected to them as follows.

1. Press the [MENU] key to open the menu.
2. Press the SYSTEM CONFIGURATION, SYSTEM SETUP and PORT SETUP soft keys.
3. Press the GPS/NMEA PORT for DATA 1 port, NMEA PORT for DATA 2 port, PC/NMEA EXT, BUZZ PORT for DATA 4 port soft key as appropriate. One of the following displays appears depending on your selection.

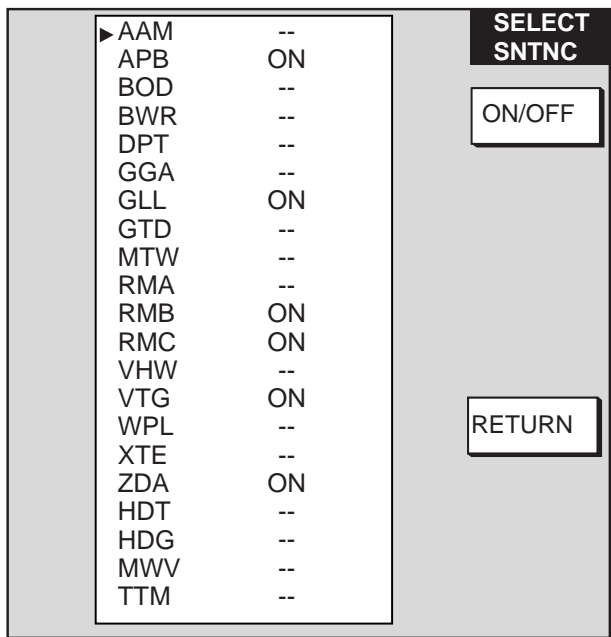
<p>▶ FURUNO GPS SENSOR YES OUTPUT FORMAT NMEA0183 Ver 2.0 LAT/LON FORMAT DD° MM.MMM' OUTPUT DESTINATION NO</p> <p>WIRING INFORMATION TD-A >1>---WHITE TD-B >2>---BLUE RD-A >3>---YELLOW RD-B >4>---GREEN +12V >5>---RED GND >6>---BLACK FG >7>---SHIELD</p>	<p style="text-align: right;">GPS/ PORT</p> <p style="text-align: right;">EDIT</p> <p style="text-align: right;">SELECT SNTNC</p> <p style="text-align: right;">RETURN</p>
<u>DATA 1 port</u>	

<p>▶ FURUNO GPS SENSOR NO OUTPUT FORMAT NMEA0183 Ver 2.0 LAT/LON FORMAT DD° MM.MMM' OUTPUT DESTINATION NO</p> <p>WIRING INFORMATION TD-A >1>---WHITE TD-B >2>---BLACK RD-A >3>---YELLOW RD-B >4>---GREEN NC >5> FG >6>---SHIELD</p>	<p style="text-align: right;">NMEA PORT</p> <p style="text-align: right;">EDIT</p> <p style="text-align: right;">SELECT SNTNC</p> <p style="text-align: right;">RETURN</p>
<u>DATA 2 port</u>	

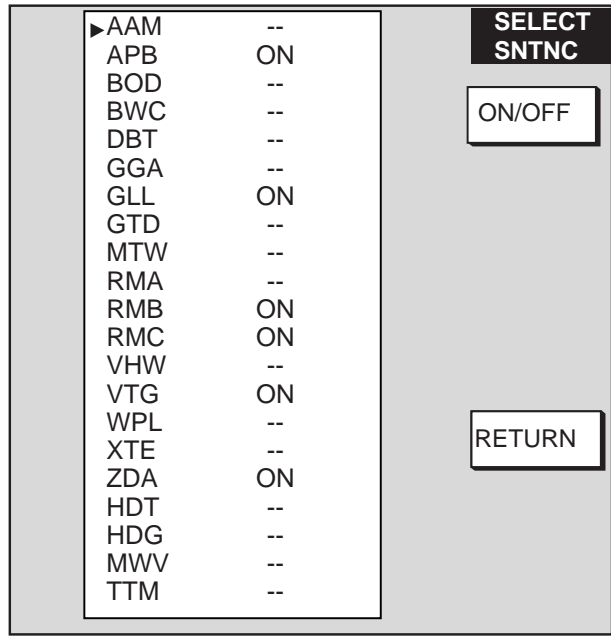
<p>▶ NMEA OUTPUT FORMAT NMEA VER. 2.0 BAUD RATE 4800bps BIT LENGTH 8 bits STOP BIT 1 bit PARITY NONE</p> <p>(CONTROL: Xon/Xoff)</p> <p>WIRING INFORMATION TxD >1>---WHITE RxD >2>---BLUE RD-A >3>---YELLOW RD-B >4>---GREEN +12V >5>---RED EXT BUZZ >6>---BLACK GND >7>---SHIELD</p>	<p style="text-align: right;">NMEA PORT</p> <p style="text-align: right;">EDIT</p> <p style="text-align: right;">SELECT SNTNC</p> <p style="text-align: right;">RETURN</p>
<u>DATA 4 port</u>	

DATA1, DATA2, DATA 4 PORT menus

4. Select item and press the EDIT soft key.
5. Set option referring to the tables on pages 3-17 and 3-18.
6. To select NMEA data sentences to output, press the SELECT SNTNC soft key.
 For NETWORK port, select the sentence to output to the network equipment (default: all OFF).



NMEA Version 2.0 □
Range and bearing mode: Rhumb line



NMEA Version 1.5
Range and bearing mode: Great circle

NMEA data sentences

7. Select sentence and press the ON/OFF soft key to show ON (output) or "- -" (no output) as appropriate.
8. Press the RETURN soft key.
9. Press the [MENU] key to quit.

Contents of DATA 1 and DATA2 PORT menus

Item	Description	Settings	Default Setting
FURUNO GPS Sensor	Selects whether the GPS Receiver GP-310B/320B is connected to the DATA1 or DATA2 port or not.	Yes, No	Yes (DATA1) No (DATA2)
Output Format	Selects NMEA output version for the equipment connected.	NMEA0183 Ver. 1.5, NMEA0183 Ver. 2.0	NMEA0183 Ver. 2.0
Lat/Lon Format	Selects latitude/longitude format to output.	DD°MM.MM', DD°MM.MMM, DD°MM.MMMM'	DD°MM.MMM'
Output Destination	Selects whether to output route (data sentence RTE) and waypoint data (data sentence WPL) when destination is set.	Yes, No	No
SELECT SNTNC (soft key)	Selects data sentence(s) to output. Select sentence with the trackball and press the ON/OFF soft key to show ON or "- -" (OFF) as appropriate. See the figure above for sentence and default settings.		

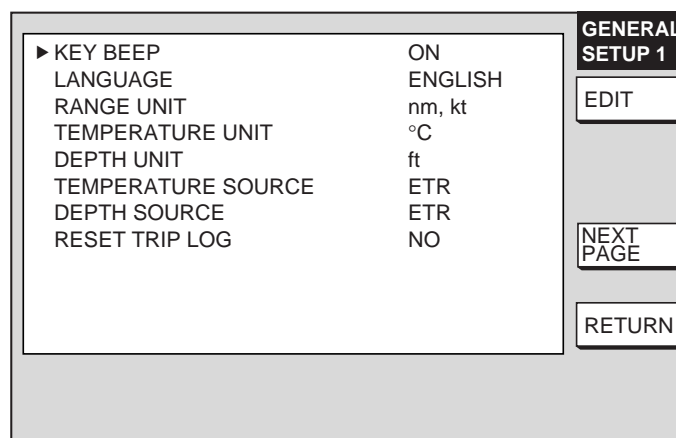
Contents of DATA 4 PORT menu

Item	Description	Settings	Default Setting
NMEA Output Format	Selects NMEA output format.	NMEA Ver. 1.5, NMEA Ver. 2.0	NMEA Ver. 2.0
Baud Rate	Sets baud rate.	4800, 9600, 19200 (bps)	4800(bps)
Bit Length	Sets character length.	8 bit, 7 bit	8 bit
Stop Bit	Sets number of stop bits.	1 bit, 2 bit	1 bit
Parity	Sets parity bit.	Even, Odd, None	Even
SELECT SNTNC (soft key)	Chooses data sentences to output. For further details see the illustration "NMEA data sentences" on page 3-17.		

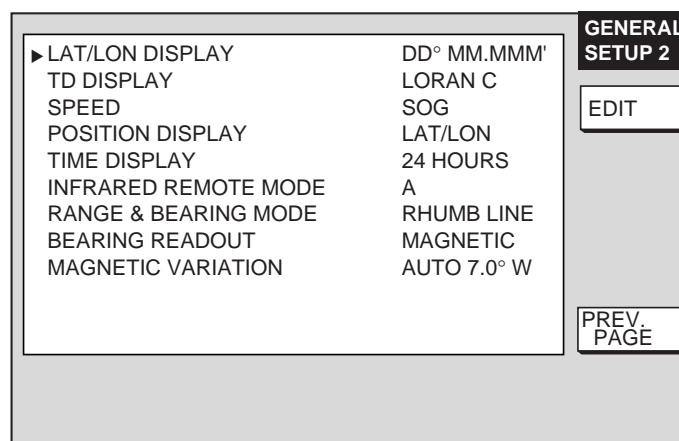
3.7 Remote Controller Setting

A remote controller can be set exclusively for use with a specific display unit, in the case of multiple NavNet display units. Set the remote controller ID mode desired on the menu and attach appropriate label (supplied with accessories) to the remote controller and display unit.

1. Press the [MENU] key followed by the SYSTEM CONFIGURATION and GENERAL SETUP soft key to show the GENERAL SETUP menu.



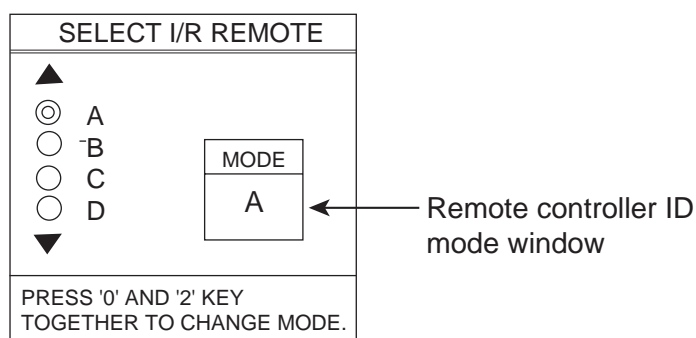
Page 1



Page 2

GENERAL SETUP menu

2. Press the NEXT PAGE soft key to show Page 2.
3. Select INFRARED REMOTE MODE, and press the EDIT soft key.
The SELECT I/R REMOTE window appears.
4. Point the remote controller toward the display unit, and press any key on the remote controller. Preset mode appears in the remote controller ID mode window.



Select I/R REMOTE window

5. After the confirmation of the remote controller mode on the window, and press the [0] and [2] key together on the remote controller to change the controller ID mode setting among A, B, C and D.
6. Operate the trackball so that the display ID should be the same as the controller mode setting.
7. Press the [MENU] key to close the menu.

3.8 Remote Display Setting

MODEL 1800C/1900C series and GD-1900C NavNet display unit can be used as a remote display for FAR/FR-2805, 2105 series etc. by using optional cable assy MJ-B24LPF0008-100 (10 m), 200 (20 m) or 300 (30 m).

To use the display unit as remote display, do the following procedure.

1. Open the RADAR SETUP menu.
2. Use the trackball or [ENTER] knob to select MONITOR MODE, and press the EDIT soft key or [ENTER] knob.
3. Select ON.
4. Turn the MBS function off at the main radar.
5. Turn the VIDEO ADJUST on at the NavNet display unit.
6. Select "H" at the ANTENNA TYPE on the RADAR SETUP menu.

Note: TX blanking function is not available when the MONITOR MODE is ON. To set a TX blanking sector, select OFF from MONITOR MODE on the NavNet equipment, and then set the sector same as the main radar. Finally, set MONITOR MODE to ON.

When the MONITOR MODE is ON, the following functions are not available.

- Tuning (auto/manual, on the RADAR SETUP menu)
- Antenna rotation (RADAR SETUP menu)
- TX sector blanking (RADAR DISPLAY SETUP menu)
- Watchman (RADAR DISPLAY SETUP menu)
- Pulse select (Soft key)

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4. OPTIONS

4.1 ARP Kit ARP-11

Necessary parts

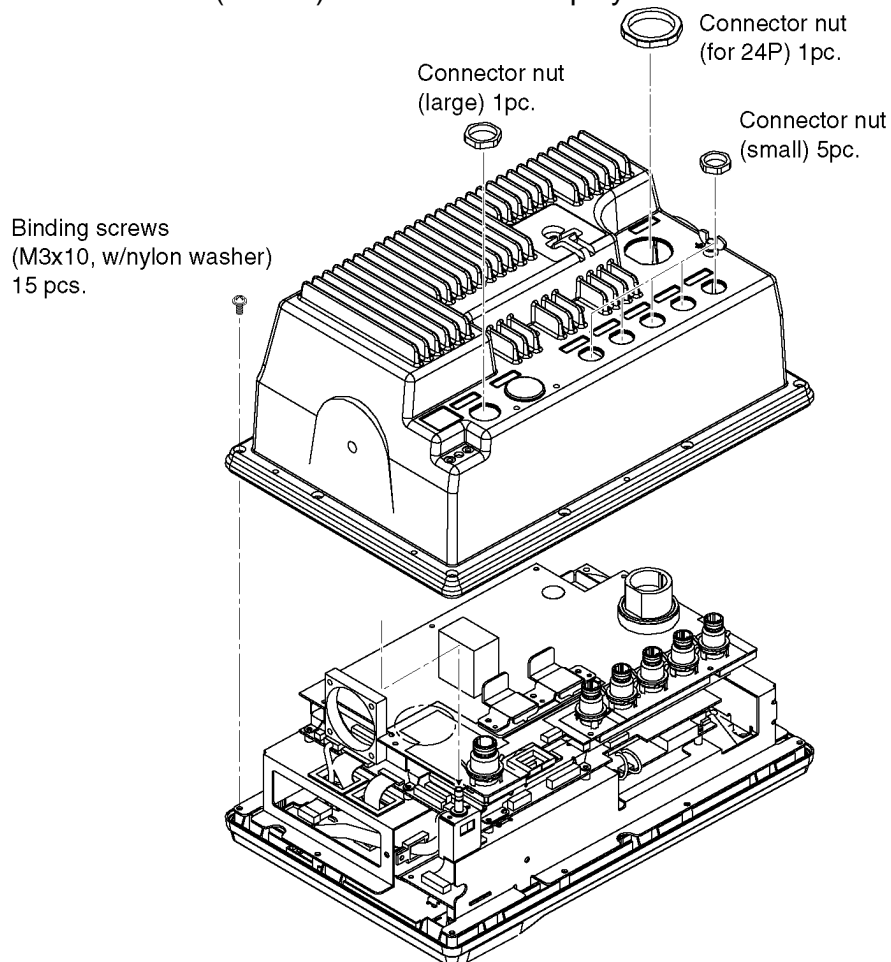
Name: ARP kit
 Type: ARP-11
 Code no.: 008-523-050

Table 4-1 ARP-11 contents

Name	Type	Code No.	Qty
ARP Board	18P9013	008-521-830	1
Pan head screw	M3x6 C2700W	000-881-403	4
Spacer*	SQ9	000-801-850	1
	SQ15	000-801-779	3
Spring washer*	M3 C5191W	000-864-204	3

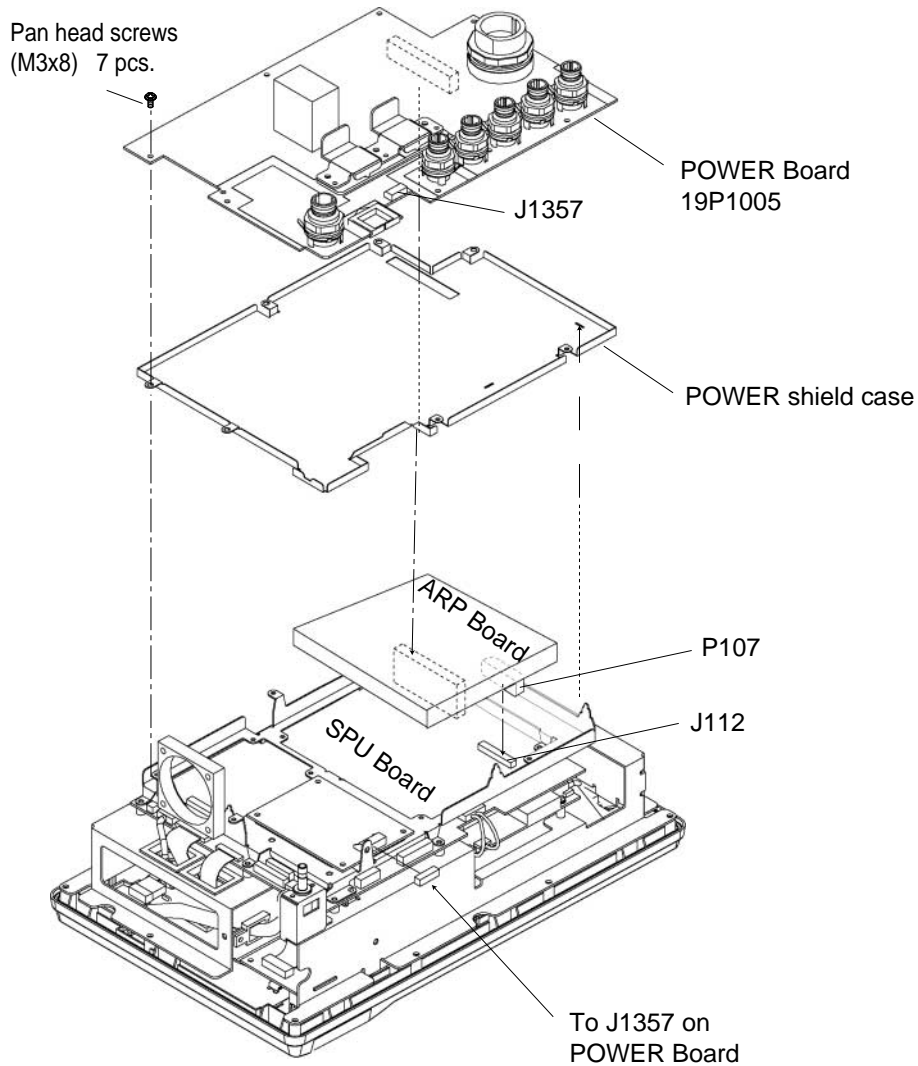
*Not used

1. Unscrew seven connector nuts at the rear of the display unit.
2. Unfasten 15 binding screws (M3x10) to remove the display cover.



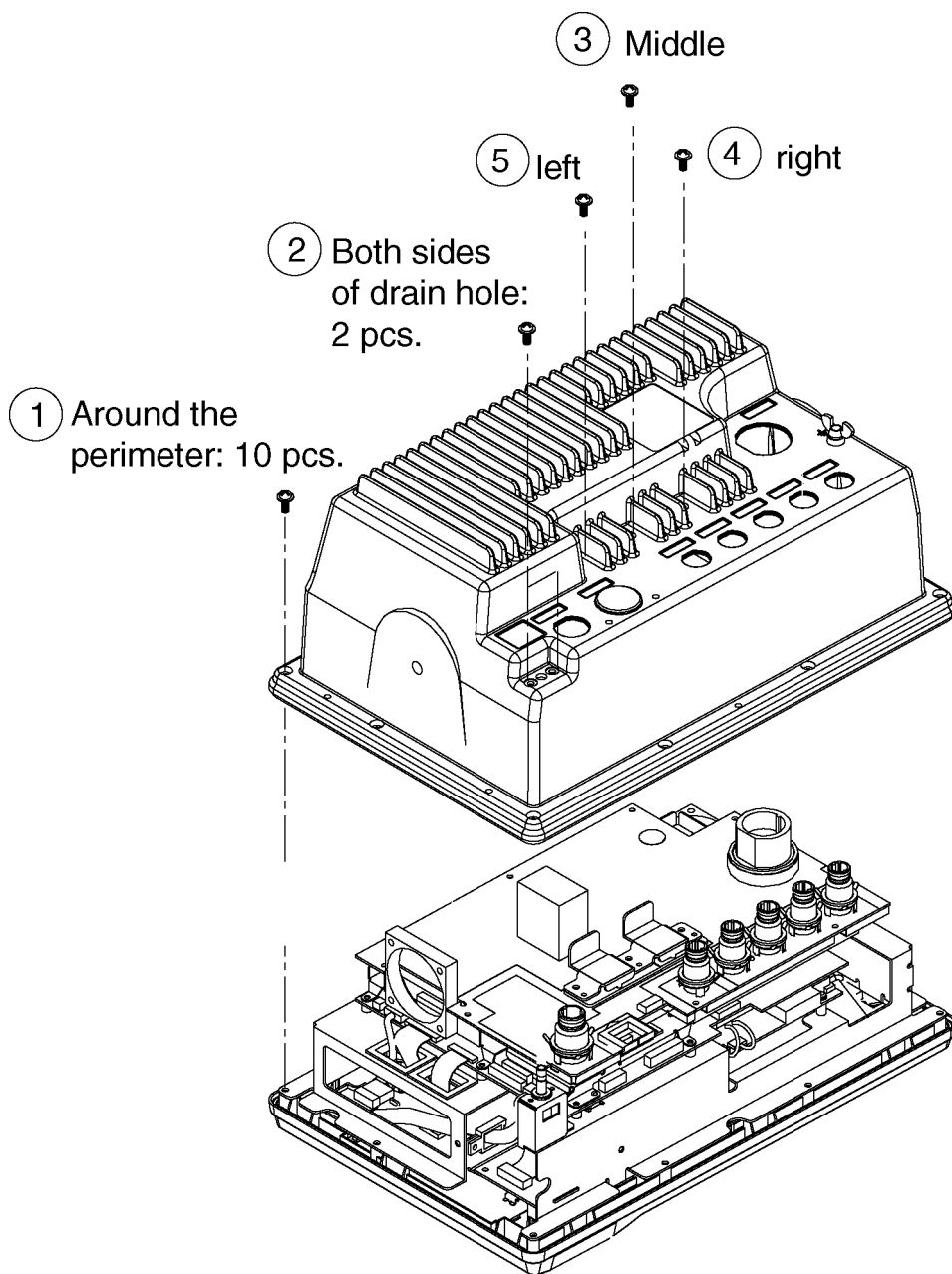
Removing the display unit cover

3. Disconnect the PH5P connector from J1357 on the POWER Board (19P1005).
4. Unfasten seven pan head screws (M3x8) to dismount the POWER Board and POWER shield case from the display unit.



Dismounting the POWER Board

5. Mate P107 on the ARP Board (option) to J112 on the SPU Board.
6. Fix the ARP Board on the SPU Board with four pan head screws and spring washers (supplied with option kit).
7. Remount the POWER Board and power shield case with pan head screws (M3x8, 7pcs.)
8. Attach the PH5P connector to J1357 on the POWER Board.
9. Fasten screws in order shown on the next page to mount the display cover.



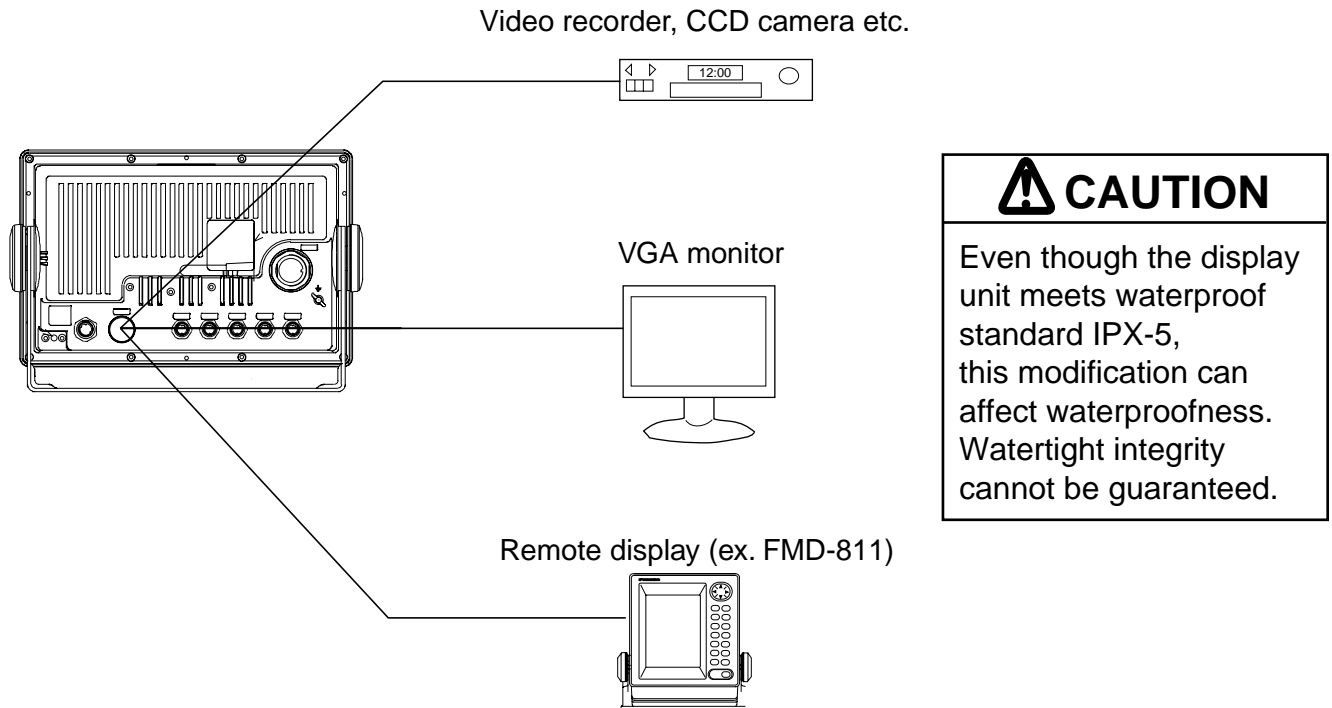
③ ④ ⑤ screws: The torque should be 0.54 ± 0.05 N·m.

Order of fastening screws

10. Fasten seven connector nuts.

4.2 Connection of Video equipment / External Monitor/Remote Display

The above units can be connected to the MODEL1823C/1833C/1933C/1943C/1953C and GD-1900C by using the hole at the rear of the display unit. Remove the cover to use this hole. After connecting, cover the hole with soft putty to seal.



Connection of Video equipment/External monitor/remote display

4.2.1 Connecting video equipment

The display unit can show the picture from the CCD camera, video recorder etc. which outputs composite signal in NTSC/PAL format, by using the optional NTSC/PAL interface kit.

Necessary parts

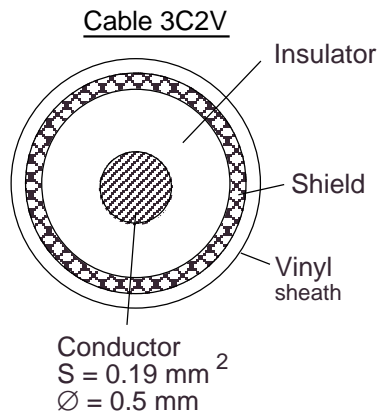
Name: NTSC/PAL Interface kit
 Type: OP03-175
 Code no.: 008-523-070

Table 4-2 NTSC/PAL Interface kit contents

Name	Type	Code No.	Qty	Remarks
PIP board	19P1004	008-521-890	1	NTSC/PAL interface Board
Pan head screw	M3x6 C2700W	000-881-403	4	
Connector assy	RCA-TMP-L230	000-144-615	1	
Cable tie	SG-130	000-809-171	3	w/foot for fixing
Rubber grommet	MG-4	000-871-378	1	

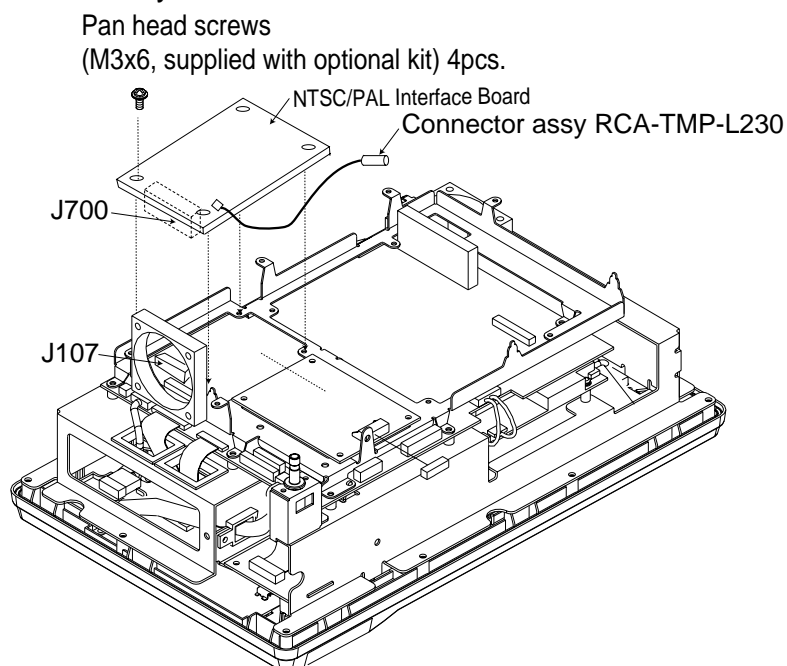
For connection with the CCD camera/video recorder, the following cable is necessary (local supply).

- Both side connectors: RCA connector (metal)
- Cable length: shorter than 10 m
- 2.5C2V or 3C2V (Japan Industrial Standard (JIS), or the equivalent) coaxial cable (Impedance: 75 Ω)



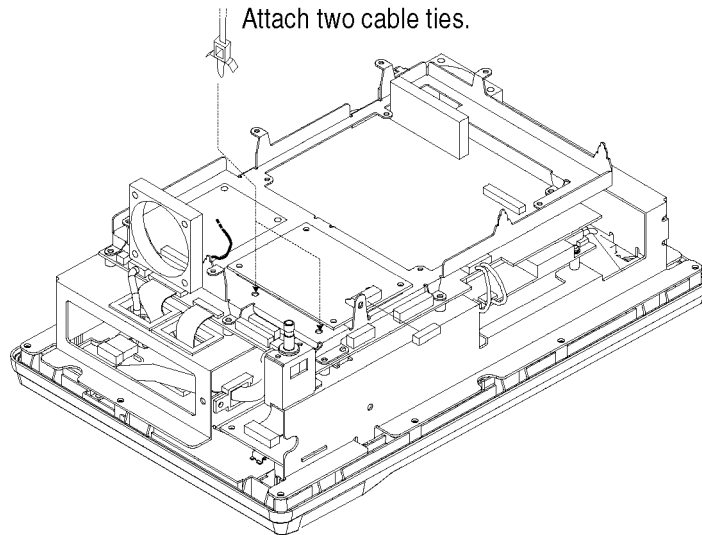
3C-2V cable, sectional view

1. Remove the display unit cover, POWER Board and power shield case referring to the step 1 through 4 on the “4.1 ARP kit ARP-11.”
2. Attach the NTSC/PAL Interface Board to the SPU Board with four pan head screws (M3x6, supplied with optional kit) so that J700 connector on the NTSC/PAL Interface Board faces to J107 on the SPU Board.
3. Attach the connector assy RCA-TMP-L230 to J701 on the NTSC/PAL Interface Board.



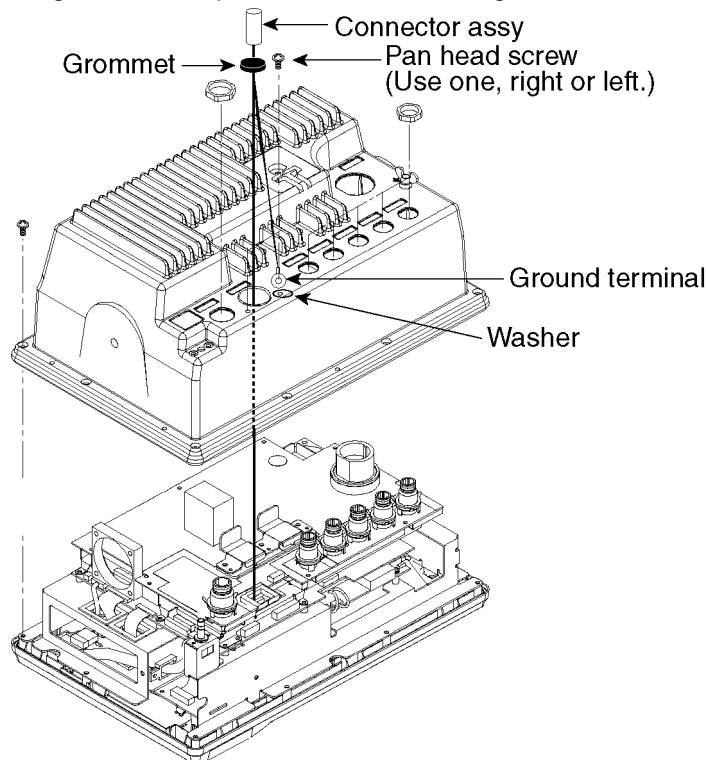
NTSC/PAL Interface Board attachment

4. Set two cable tie "legs" (supplied with option kit) as shown below.



Cable ties attachment.

5. Tie the connector assy with two cable ties attached at step 4.
6. Remount the POWER Board and power shield case with pan head screws (M3x8, 5 pcs.)
7. Attach the PH5P connector from SPU Board to J1357 on the POWER Board.
8. Pass the connector assy through the saddle on the POWER Board.
9. Remount the display unit cover referring to the illustration on page 4-3 so that the cable runs through the hole the connector cover removed.
10. Cut a "cross" in the grommet to pass the cable through it and then attach the grommet.



Display unit, passing the PIP cable

11. Fasten the ground wire of the connector assy with a pan head screw (M4x10) shown in the above. Finally, cover the hole with soft putty to seal

4.2.2 Connecting external monitor

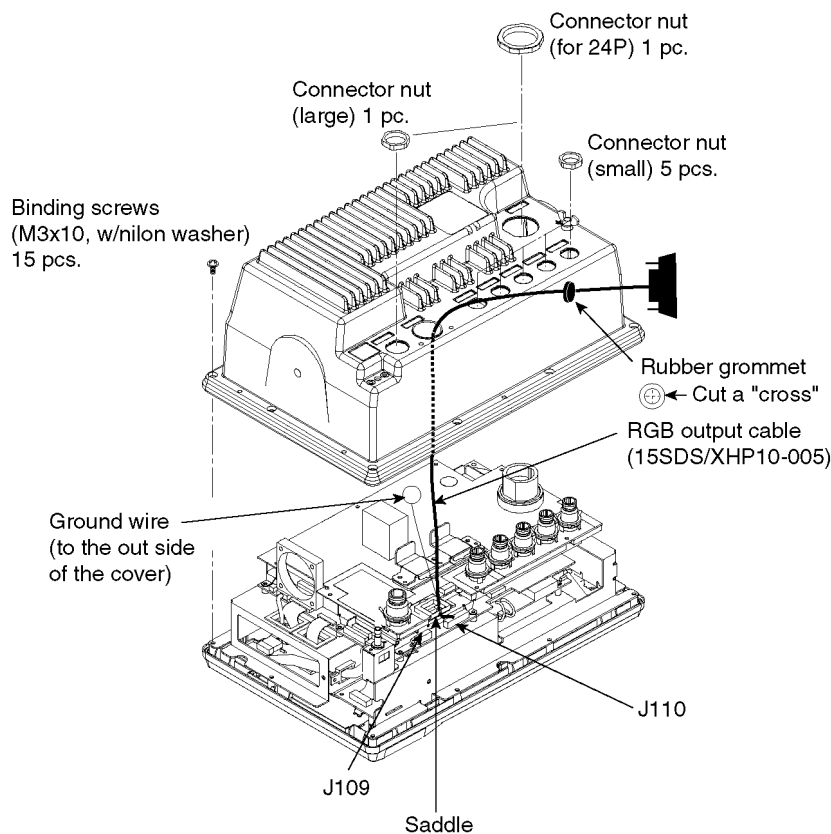
You can display the MODEL1823C/1833C/1933C/1943C screen on the external monitor, which accepts industrial standard VGA input by using the optional RGB output cable kit OP03-176. Supply monitor and interconnection cable (with HD-15P connectors of male, three rows of 15 pins) locally.

Necessary parts for external monitor

Name: RGB output cable kit
 Type: OP03-176
 Code No.: 008-526-360

Name	Type	Code No.	Qty
Cable assy.	15SDS/XHP10-005	000-144-511	1
Grommet	MG-4	000-871-378	1

1. Unscrew 15 binding screws (M3x10, w/nylon washer) and seven connector nuts to remove the display unit cover.
2. Cut a "cross" in the grommet (to pass the cable).
3. Pass the RGB output cable through the grommet hole at the rear of the display unit cover and the saddle on the POWER Board, and then connect the XH connector (10P) of the RGB output cable to J110 on the SPU Board. Put the ground wire of the cable outside of the cover.
4. Reassemble the display unit referring to the illustration on page 4-3.
5. Fix the ground wire of the cable with one of two screws both sides of the connector hole.
6. Finally, cover the hole with soft putty to seal

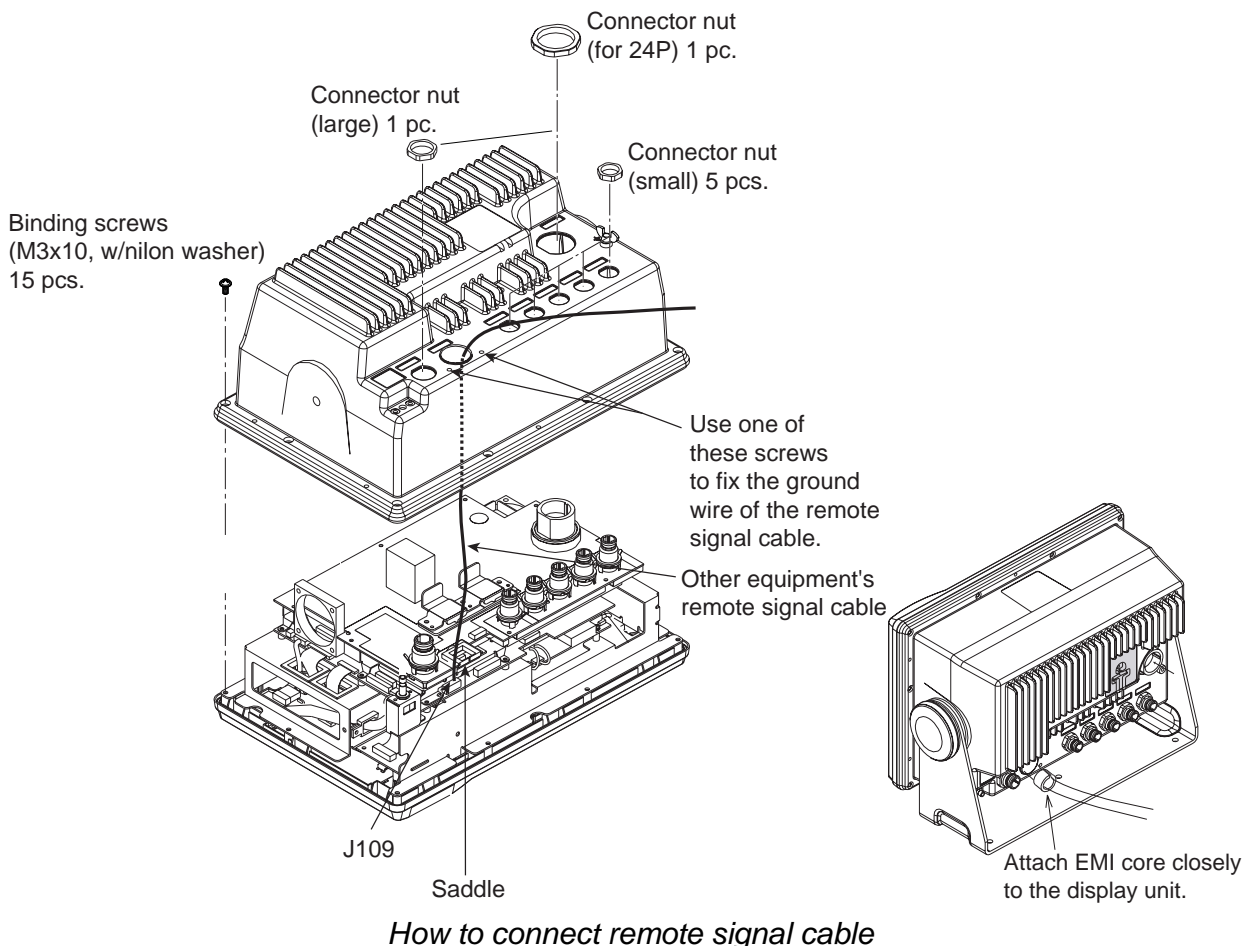


How to connect 15SDS/XHP10-005

4.2.3 Connecting remote display

The FURUNO Display unit FMD-811, MODEL1832 or GD-280/380, etc. can be connected to the NavNet display as remote display. To interconnect them, use a cable attached with or set as option for the remote display. For the network system consists of some units, connect the remote display cable to the one selected as radar source. Also, the optional EMI core (Type: E04R241336A, Code No.:000-146-335) should be attached to the remote display cable to prevent a noise.

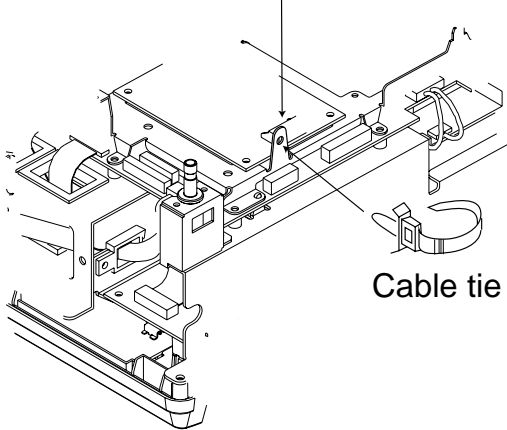
1. Unscrew 15 binding screws (M3x10, w/nylon washer) and seven connector nuts to remove the display unit cover.
2. Pass the signal cable for remote displaying through the hole at the rear of the display unit cover and the saddle on the POWER Board, and then connect the XH connector (8P) of the signal cable to J109 on the SPU Board. If your remote signal cable has the ground wire, pass it outside of the cover and fix it with the screw shown below.
3. Reassemble the display unit referring to the illustration on page 4-3.
4. Attach the EMI core (option) to the remote display cable at the closed position to the display unit.



4.2.4 Attaching more than two units

When more than two cables of PIP kit, VGA monitor cable and remote signal cable, use the cable tie supplied as the installation material with the display unit to tie optional cables. Attach the cable tie to the hole on the POWER Board.

Attach the cable tie here.



Attaching the cable tie to POWER Board

4.3 Mounting the Memory Card Interface Unit

The memory card interface CU-200 enables to use more two chart cards.

Type: CU-200-NAV

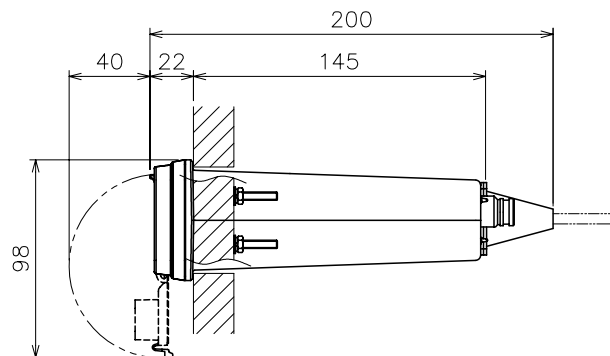
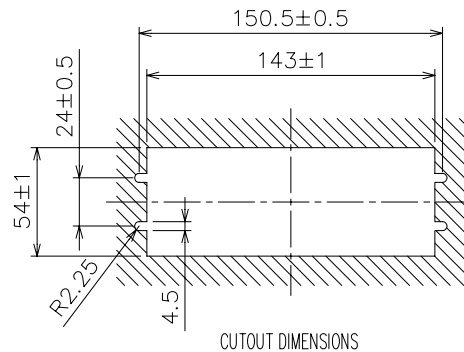
Code: 000-081-567

Name	Type	Code No.	Qty
Memory card interface	CU-200	000-081-569	1
Cable assy	MJ-A6SPF/TM11AP 8C050	000-146-289	1
Cable assy	MJ-A15A3F0003-030	000-145-513	1
Threaded rod	M4X5	000-147-539	4
Hex. nut	M4	000-863-106	4
Flat washer	M4	000-864-126	4
Spring washer	M4	000-864-256	4

Flush mounting

This unit can be flush-mounted in a panel with the standard installation materials.

1. Prepare a cutout in the mounting location, referring to the outline drawing at the end of this manual.
2. Screw in the threaded rods to the flange of the front panel of the unit securely by hands.
3. Set the unit to the cutout.
4. Insert the flat washer, spring washer and nut in that order for each rod and fasten the nuts.



Flush mounting

Desktop mount

For desktop mount, the optional desktop mount kit FP03-10201 (Code No.: 008-539-530) is required.

Name	Type	Code No.	Qty
Mounting bracket	19-023-3081-0	100-316-250	1
Self-tapping screw	5x20	000-802-081	4
Screw	M4x10	000-881-145	4

1. Put the mounting bracket 19-023-3081 on the unit.
2. Fix the mounting bracket to the unit with four screws.
3. Mount the above assembly on a desktop with four self-tapping screws.

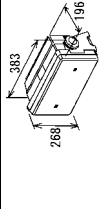
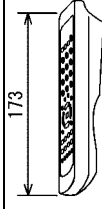
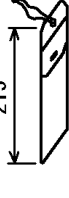
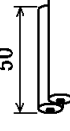
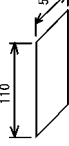
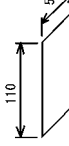
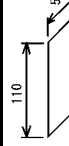
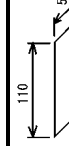
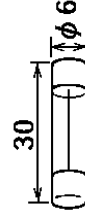
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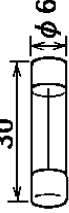
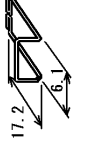
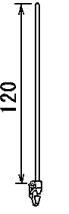

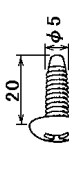
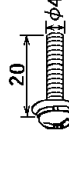
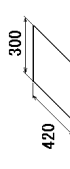

PACKING LIST

19AM-X-9851 -6

1/1

RDP-138/139 [E]

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ユニット			
指示部 DISPLAY UNIT		RDP-138-E-N 000-080-037 **	1
リモコンセット			
リモコンユニット REMOTE CONTROLLER		RMC-100 000-144-471	1
リモコンケース VINYL CASE FOR REMOTE CONTROLLER		14-034-2075-1 100-292-801	1
BATT (MIN) SIZE AA BATTERY		R6PKRCP-2 000-142-527	1
リモコン用紙(1) LABEL FOR REMOTE CONTROLLER		03-153-1314-2 100-292-792	1
リモコン用紙(2) LABEL FOR REMOTE CONTROLLER		03-153-1315-2 100-292-822	1
リモコン用紙(3) LABEL FOR REMOTE CONTROLLER		03-153-1316-2 100-292-832	1
リモコン用紙(4) LABEL FOR REMOTE CONTROLLER		03-153-1317-2 100-292-842	1
予備品			
SPARE PARTS			
SP03-14001			
ヒューズ FUSE		FGBO 7A AC125V 000-549-013	3

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ヒューズ FUSE		FGBO 15A AC125V 000-549-014	3
付属品			
ACCESSORIES			
FP03-09301			
カード用紙 CARD REMOVER		03-153-1311-0 100-292-130	1
工率材料			
INSTALLATION MATERIALS			
CP03-22701			
ケーブルバンド CABLE TIE		SG-130 000-809-171	1
ヒューズ用紙 FUSE LABEL		03-153-1312-0 100-292-140	1
+トAPPING スクリュー +TAPPING SCREW		5X20 SUS304 1/2 000-802-081	4
+ワッシャー B WASHER HEAD SCREW		M4X20 SUS304 000-804-742	6
型紙 TEMPLATE SHEET		19-022-1511-0 100-292-770	1
その他工材			
OTHER INSTALLATION MATERIALS			
ケーブル組品 CABLE ASSY.		MJ-A3SPF0018-050Z 000-139-872	1

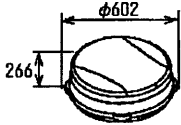

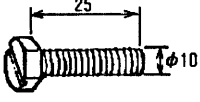
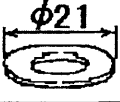

注記) コード末尾に[**]の付いたユニットは代表の型式/コードを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

19AL-X-9852 -1 1/1

RSB-0071-057

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
(完) 空中線部 ANTENNA UNIT		RSB-0071-057 000-086-830	1
空中線部工材 ANTENNA UNIT INSTALLATION MATERIALS		CP03-16901	
EMCコア EMC CORE		E04SS251512 000-144-673	1
六角ボルト 刈割 HEX. BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308	4
ミガキ平座金 FLAT WASHER		M10 SUS304 000-864-131	4
スプリング座金 SPRING WASHER		M10 SUS304 000-864-261	4

注記)

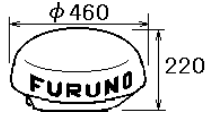
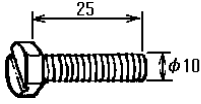
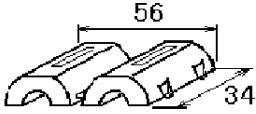
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C3502-Z02-B

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

19A0-X-9851 -1 1/1

RSB-0094-075

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		RSB-0094-075 000-080-237	1
工事材料 INSTALLATION MATERIALS CP03-25401			
六角ボルト スリ割 HEX. BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308	4
EMIコア EMI CORE		RFC-10 000-141-085	1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

工事材料表 INSTALLATION MATERIALS		MODEL1833/1833C		CODE NO.	19AL-X-9401-1
				TYPE	1/1
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ケーブル組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0002-100	1	選択 TO BE SELECTED
			CODE NO. 000-138-972		
2	ケーブル組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0002-150	1	選択 TO BE SELECTED
			CODE NO. 000-138-970		
3	ケーブル組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0002-200	1	選択 TO BE SELECTED
			CODE NO. 000-138-974		
4	ケーブル組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0002-300	1	選択 TO BE SELECTED
			CODE NO. 000-138-973		

DWG NO.
C3502-M01- B

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

工事材料表		MODEL1933/1933C MODEL1943/1943C		CODE NO.	19AL-X-9402-1
INSTALLATION MATERIALS				TYPE	1/1
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ケーブル組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0005-100	1	選択 TO BE SELECTED
			CODE NO. 000-140-434		
2	ケーブル組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0005-150	1	選択 TO BE SELECTED
			CODE NO. 000-140-435		
3	ケーブル組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0005-200	1	選択 TO BE SELECTED
			CODE NO. 000-140-436		
4	ケーブル組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0005-300	1	選択 TO BE SELECTED
			CODE NO. 000-140-437		

DWG NO.

C3504-M01- B

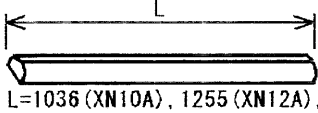
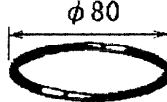
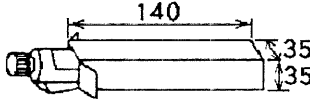
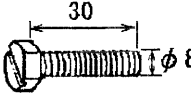
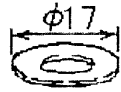
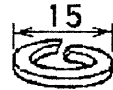
FURUNO ELECTRIC CO., LTD.

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19AK-X-9856 -3 1/1

XN10A, XN12A

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
アンテナ ANTENNA	 L=1036 (XN10A), 1255 (XN12A).	XN10A, 12A 008-523-***	1
アンテナ工材 ANTENNA INSTALLATION MATERIALS		CP03-22901	
Oリング O-RING	 φ 80	JISB2401-1A-680 000-851-313	1
スリーボンド SEALANT	 140 φ 35	1211 50G 000-854-118	1
六角ボルト スリワリ HEX. BOLT	 30 φ 8	M8X30 SUS304 000-862-151	4
ミガキ平座金 FLAT WASHER	 φ 17	M8 SUS304 000-864-130	4
バネ座金 SPRING WASHER	 15	M8 SUS304 000-864-262	4



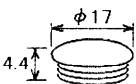
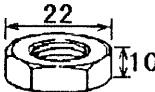


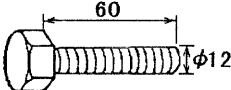
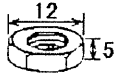


DWG NO.

C3500-Z01- C

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-503-360	03FR-X-9401-7
TYPE	CP03-18401	1/2

工事材料表 INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	シールワッシャー SEAL WASHER		03-001-3002-0	4	
			CODE NO. 300-130-020		
2	防蝕ゴム CORROSION-PROOF RUBBER MAT		03-142-3001-0	1	
			CODE NO. 100-275-580		
3	キャップ CAP		040-4010	4	
			CODE NO. 000-515-332		
4	六角ナット 1種 HEX. NUT		M12 SUS304	4	
			CODE NO. 000-863-112		
5	ミガキ平座金 FLAT WASHER		M12 SUS304	4	
			CODE NO. 000-864-132		
6	ハネ座金 SPRING WASHER		M12 SUS304	4	
			CODE NO. 000-864-263		
7	六角ボルト (全ネジ) HEX. BOLT		M12X60 SUS304	4	
			CODE NO. 000-862-191		
8	六角ナット 1種 HEX. NUT		M6 SUS304	1	
			CODE NO. 000-863-109		
9	ミガキ平座金 FLAT WASHER		M6 SUS304	3	
			CODE NO. 000-864-129		
10	ハネ座金 SPRING WASHER		M6 SUS304	1	
			CODE NO. 000-864-260		

DWG NO.

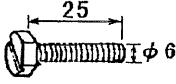
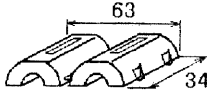
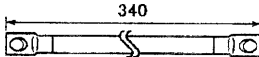
C3459-M02-G

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-503-360	03FR-X-9401-7 2/2
TYPE	CP03-18401	

工事材料表 INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
11	六角ボルト HEX. BOLT		M6X25 SUS304	1	
			CODE NO.		
12	EMコア EMI CORE		RFC-13	3	
			CODE NO.		
13	アース線 GROUNDING WIRE		RW-4747-1 03S4747	1	
			CODE NO.		

DWG NO.

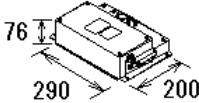
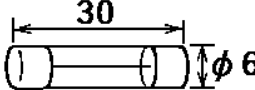
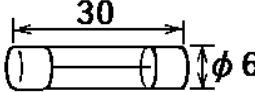
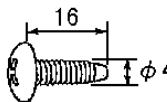
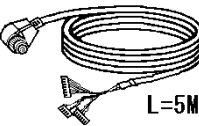

C3459-M04-G

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

PSU-005

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ユニット UNIT			
空中線電源部 POWER SUPPLY UNIT		PSU-005 000-080-190	1
予備品 SPARE PARTS		SP03-14001	
ヒューズ FUSE		FGBO 7A AC125V 000-549-013	3
ヒューズ FUSE		FGBO 15A AC125V 000-549-014	3
工事材料 INSTALLATION MATERIALS		CP03-24501	
+トラスタップネジ SELF-TAPPING SCREW		4X16 SUS304 1ｼｼ 000-802-080	4
その他工材 OTHER INSTALLATION MATERIALS			
ケーブル組品MJ CABLE ASSY.		MJ-B24LPF0009-050 000-145-887	1
ケーブル組品 CABLE ASSY.		VL3P-VV-S2X2C-AA050 000-152-217	1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

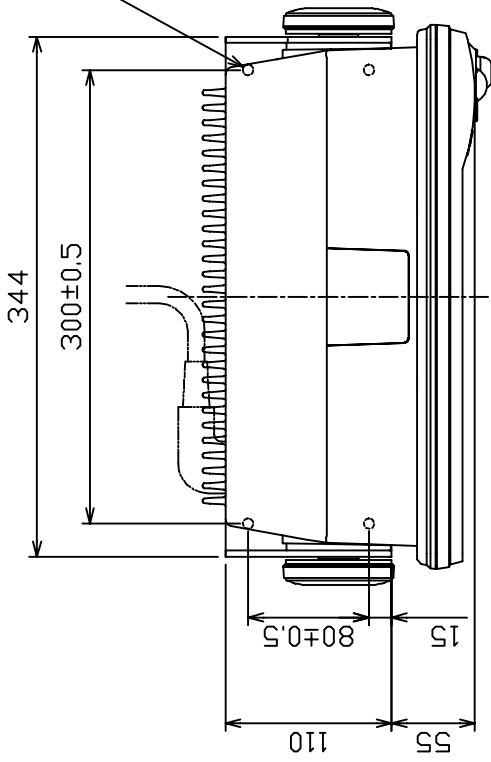
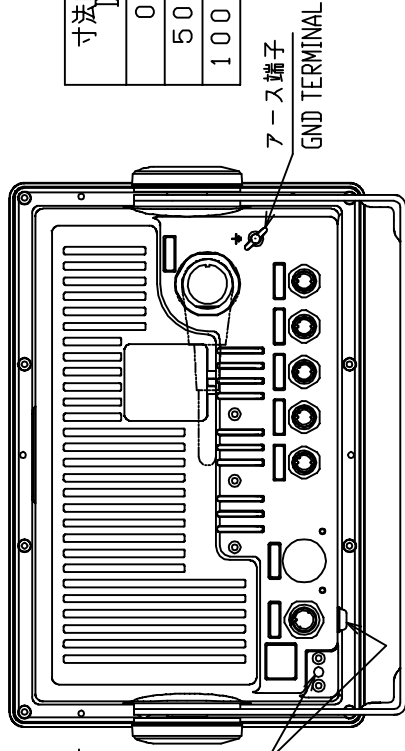


表1 TABLE 1

寸法区分 (mm)	公差 (mm)
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



矢視 A VIEW A

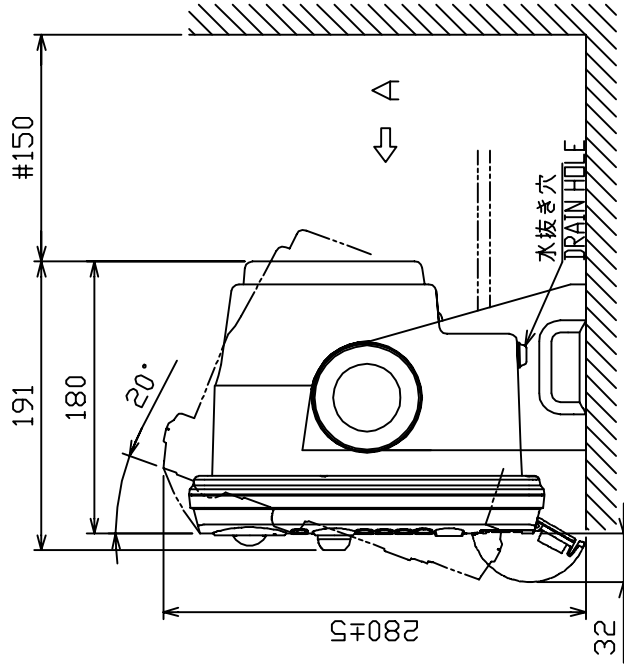
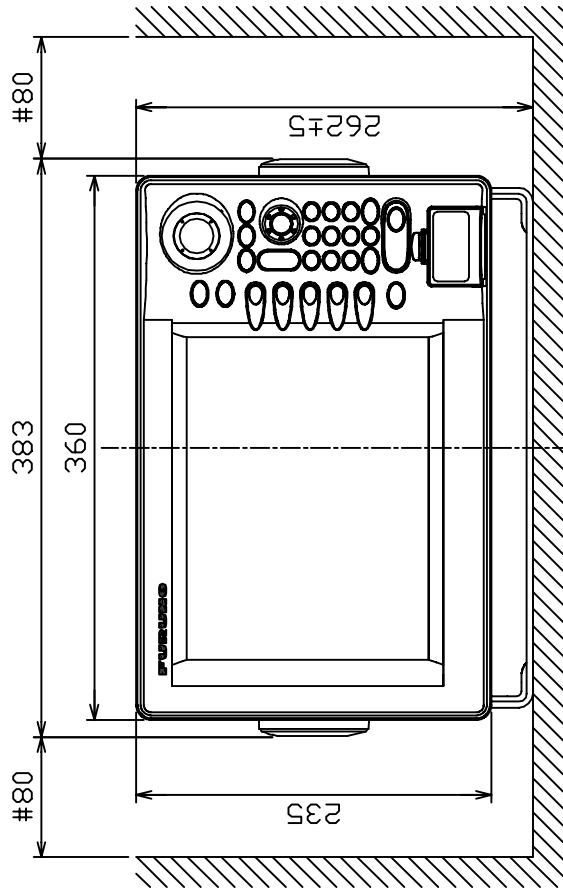


表2 TABLE 2

ユニット型式	質量
RDP-138/151	5.8kg±10%
RDP-139	6.5kg±10%
RDP-149	6.8kg±10%



注記 1) #印寸法は最小サービスクリアランスとする。

2) 指定外の寸法公差は表1による。

3) 取付用ネジは+トラスタックピンネジ呼び径5×20を使用のこと。

NOTE 1. # MINIMUM SERVICE CLEARANCE.

2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN	Dec. 8, '04	E. MIYOSHI	MODEL 1934C/1944C/1954C	TITLE	RDP-138/139/149/151
CHECKED		TAKAHASHI, T	MODEL 1933C/R	名称	指示部 (卓上装備)
APPROVED		Y. Hatai	GM-1900C/GP-1920C	外寸図	
SCALE	1/5	MASS	MODEL 1933C/1943C	NAME	DISPLAY UNIT (TABLE TOP MOUNT)
DWG.No.	C3503-G01-E	表2参照	MODEL 1933C	OUTLINE DRAWING	
					19-022-100G-5

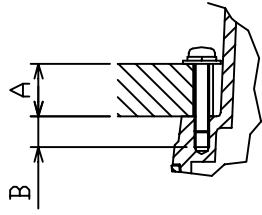
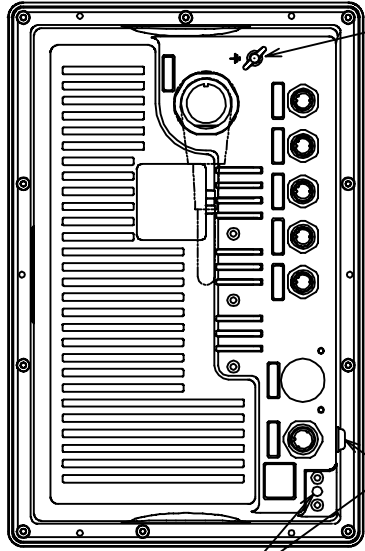


表1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

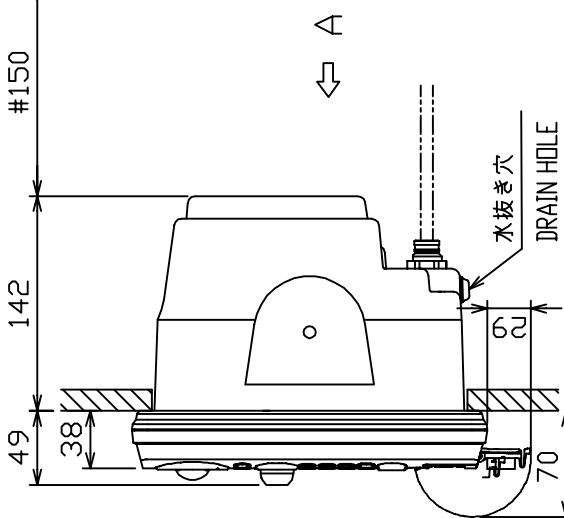
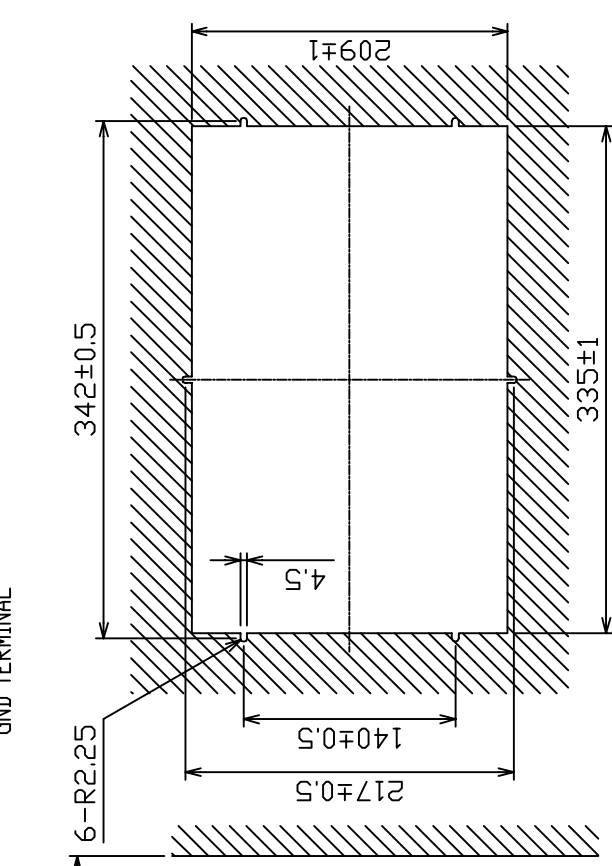
表2 TABLE 2

ユニット型式 TYPE	質量 MASS
RDP-138/151	4.9kg±10%
RDP-139	5.6kg±10%
RDP-149	5.9kg±10%

7-ス端子
GND TERMINAL

水抜き穴
DRAIN HOLE

- 注記
- 1) #印寸法は最小サージ空間寸法とする。
 - 2) 指定外の寸法公差は表1による。
 - 3) 取付用ネジは、セムスネジ M4×20 を使用のこと。
壁の厚さ (A) は $11 \leq A \leq 14$ とする。それ以外の壁に装備する場合
使用するネジの長さは $(A+7.8) \pm 2$ とする。(セムスネジ B を使用)
きょう体にはネジ部を 8 mm 以上入れないこと。(B ≤ 8)
- NOTE
1. # MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 3. USE M4x20 SCREWS FOR FIXING THE UNIT.
THICKNESS A: $11 \leq A \leq 14$ OR SCREW LENGTH: $(A+7.8) \pm 2$.
DO NOT FASTEN SCREWS INTO UNIT MORE THAN 8 mm (B ≤ 8).

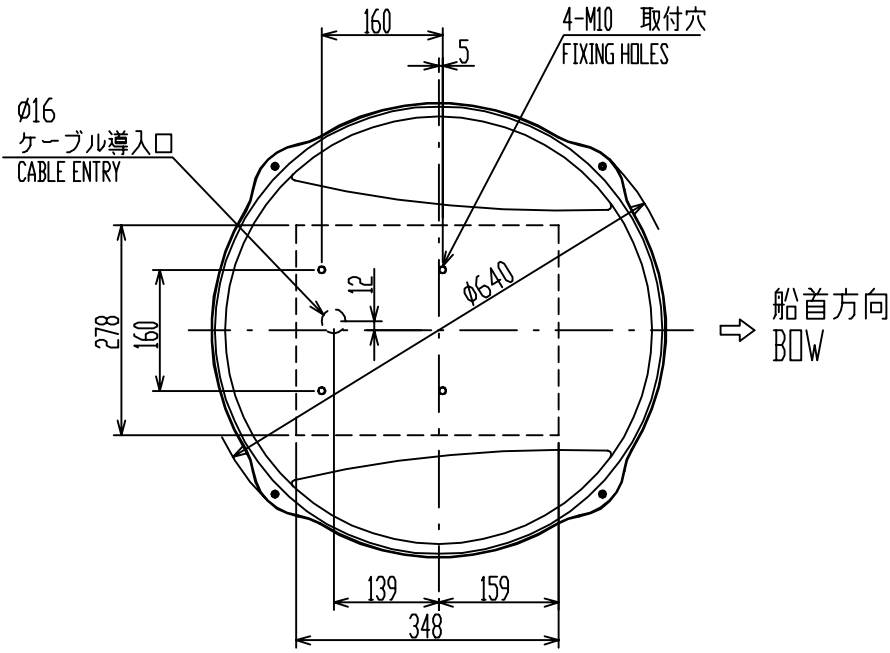


DRAWN	Jan. 12, '05 E. MIYOSHI	MODEL 1934C/1944C/1954C	TITLE	RDP-138/139/149/151
CHECKED	TAKAHASHI, T	MODEL 1933C	名称	指示部 (埋込装備)
APPROVED	Y. Hatai	CS-1906C/1920C	外寸図	
SCALE	1/5	MODEL 1932C/1943C	NAME	DISPLAY UNIT (FLUSH MOUNT)
DWG No.	C3503-002-E	MODEL 1933C	OUTLINE DRAWING	
		TABLE 2 表2参照		
				19-022-110G-4

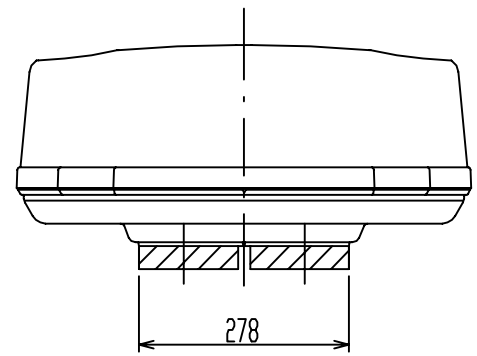
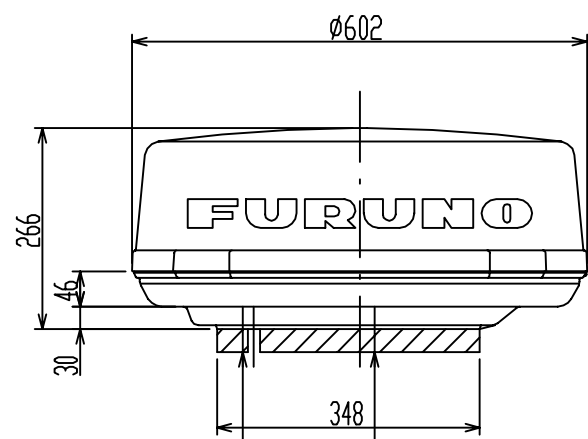
表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3
500 < L ≤ 1000	±4

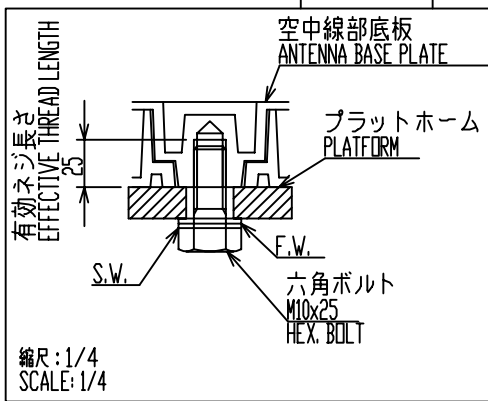
A



B



C



D

注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

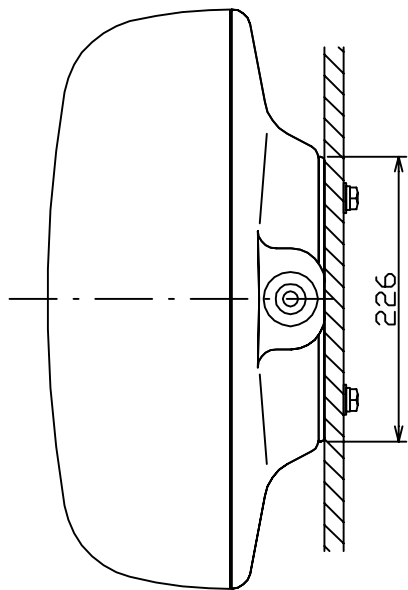
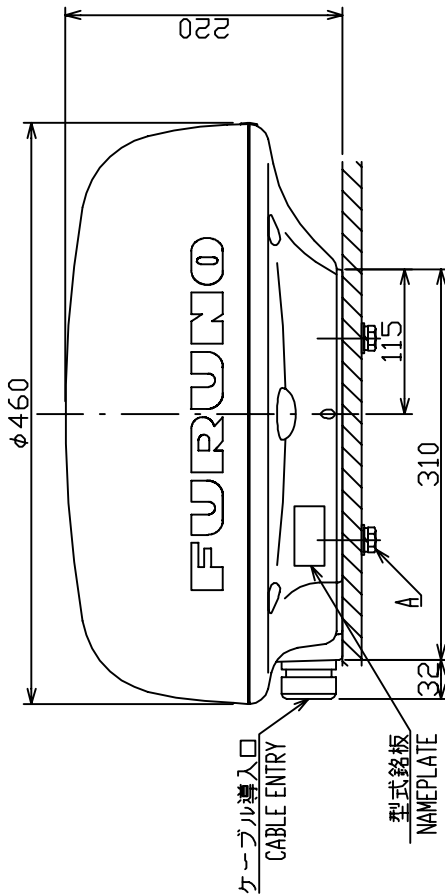
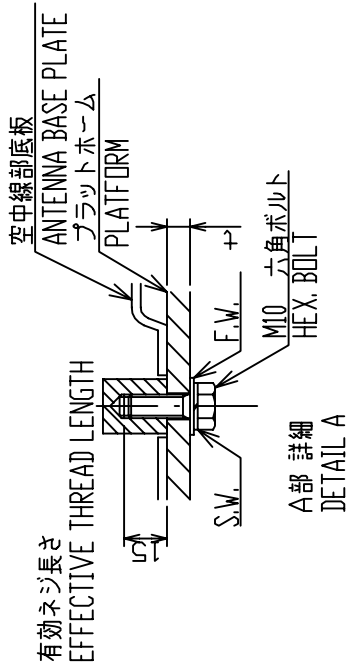
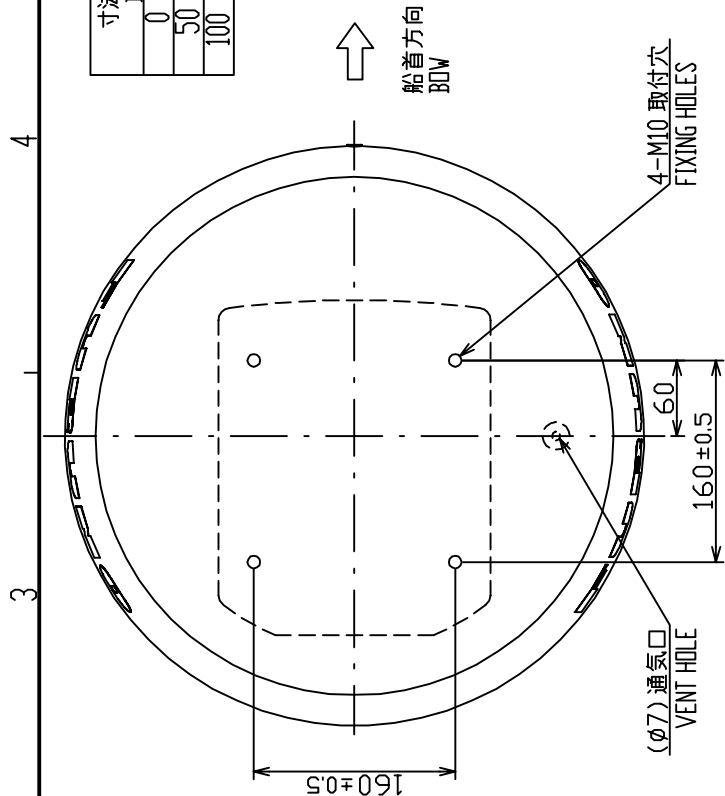
DRAWN Feb. 3, '05	E. MIYOSHI	MODEL 1734C MODEL 1834C/1834C(-BB)	TITLE RSB-0071
CHECKED	TAKAHASHI, T	MODEL 1833/1833C MODEL 1732/1732C	名称 空中線部
APPROVED	Y. Hatai	RS-1000 MODEL 1832	外寸図
SCALE 1/10	MASS 8 ±10% kg		NAME ANTENNA UNIT
DWG.No. C3441-G01-G		03-136-6001-G2	OUTLINE DRAWING

表2 TABLE 2

MODEL	MASS (kg ±0.1%)
RSB-0087/0087A/110	4.9
RSB-0094	5.2
RSB-0095	5.1

表1 TABLE 1

寸法区分(mm)	公差(mm)
DIMENSIONS	TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



- 注記
- 1) 指定外の寸法公差は表1による。
 - 2) 取付はM10ボルトを使用のこと。
ネジ長さは板厚に依りて、 20 ($t \leq 5$) または 25 ($5 < t \leq 10$) とする。
- NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. USE M10 BOLTS FOR FIXING UNIT.
SCREW LENGTH SHALL BE ACCORDING TO PLATFORM THICKNESS;
 20 ($t \leq 5$) OR 25 ($5 < t \leq 10$).

DRAWN	Y. Hatai	MODEL 1724C	TITLE	RSB-0087/0087A/0094/0095/110
CHECKED	TAKAHASHI, T	MODEL 1824C/1824C-BB	名称	空中線部
APPROVED	Y. Hatai	MODEL 1823C	外寸図	
SCALE	1/6	MODEL 1722/1722C/1723C	NAME	ANTENNA UNIT
DWG No.	C3489-G02-H	MODEL 172		OUTLINE DRAWING
		03-161-100G-3/03-164-300G-1		

表 2 TABLE 2

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3
500 < L ≤ 1000	±4
1000 < L ≤ 2000	±5

表 1 TABLE 1

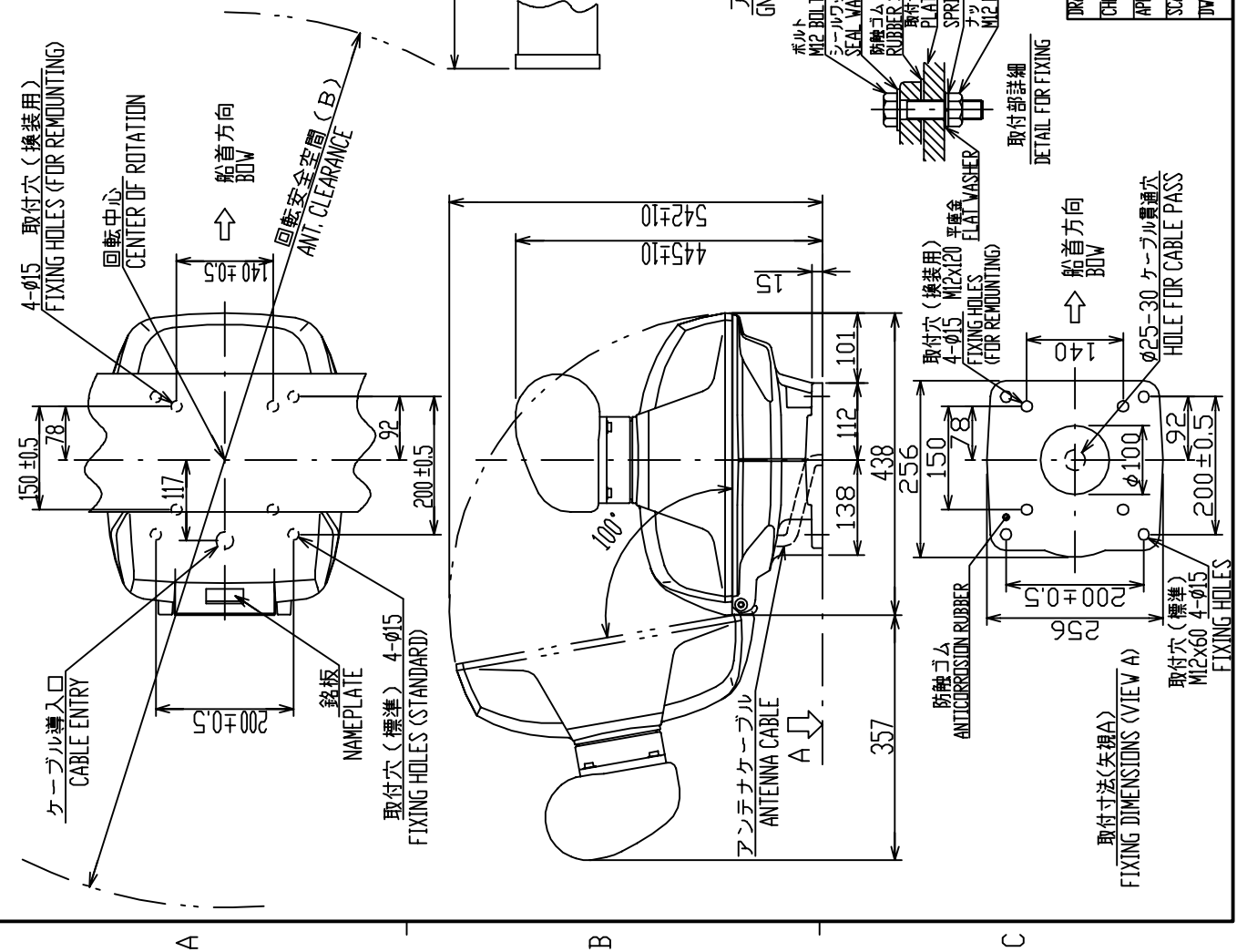
種類 TYPE	XN10A	XN12A
空中線長(A) ANT. LENGTH (mm)	1036±10	1255±10
回転安全空間(B) ANT. CLEARANCE (mm)	1200	1400
質量 (kg) MASS (10kg)	22	23

注 記

- 1) 指定外寸法公差は表2による。
- 2) 取付はM12ボルトを使用のこと。
- 3) 本機取付台にφ25-30のケーブル貫通穴を開ける。

NOTE

1. TABLE 2 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M12 BOLTS FOR FIXING THE UNIT.
3. MAKE A HOLE φ25-30 ON MOUNTING MAST FOR CABLE PASS.



DRAWN	Jan. 12, '05 E. MIYOSHI	TITLE	RSB-0070/0073
CHECKED	TAKAHASHI, T	名称	空中線部
APPROVED	Y. Hatai	外寸図	
SCALE	1/10	NAME	ANTENNA UNIT
DRAWING NO.	C3500-G01-D	OUTLINE DRAWING	

表 1 TABLE 1

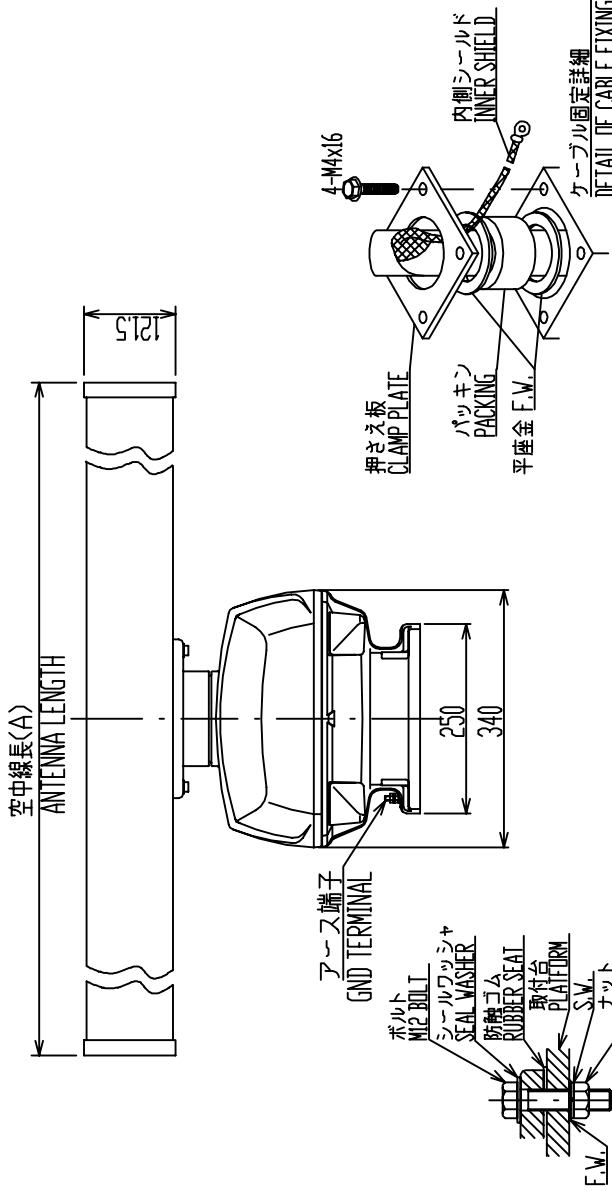
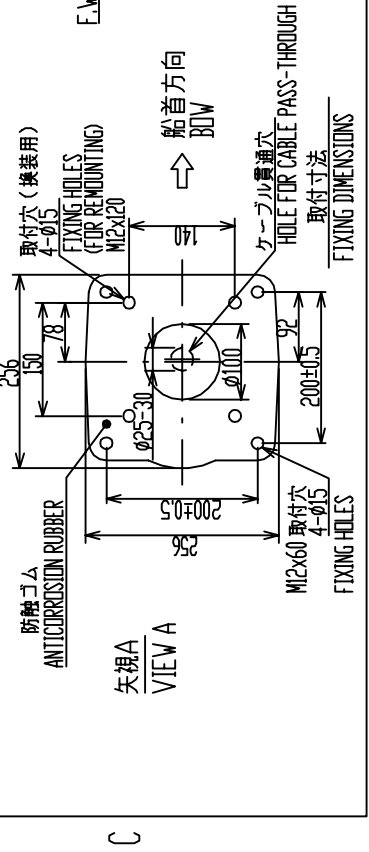
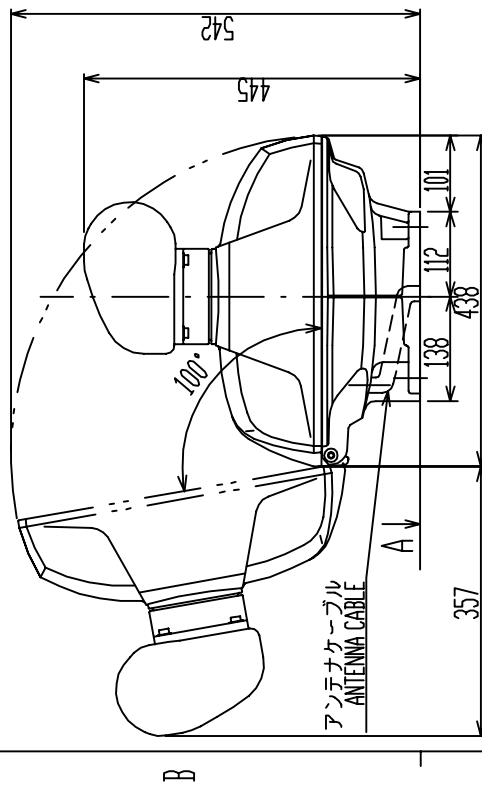
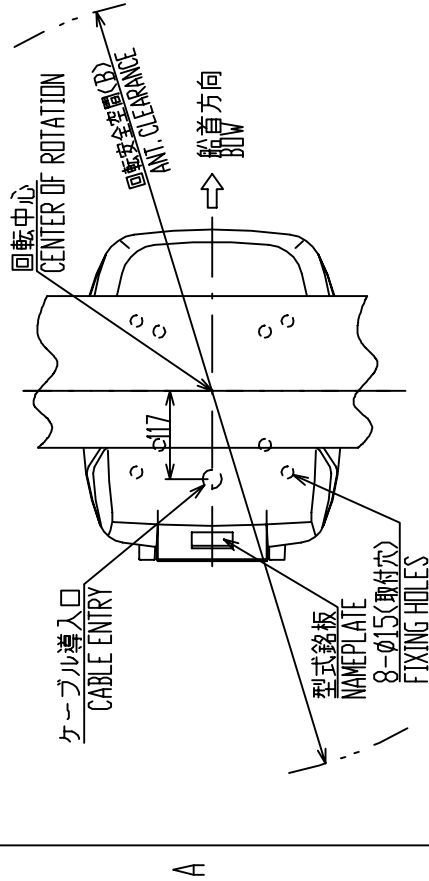
寸法範囲 (mm) DIMENSIONS	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5mm
50 < L ≤ 100	±2.5mm
100 < L ≤ 500	±3mm
500 < L ≤ 1000	±4mm
1000 < L ≤ 2000	±5mm

表 2 TABLE 2

種別 TYPE	XN12A	XN13A
空中線長(A) ANT. LENGTH(mm)	1255±10	1795±10
安全空間(B) ANT. CLEARANCE(mm)	1400	1940
質量(kg) MASS	25	27

- 注記
- 1) 指定外寸法公差は表1による。
 - 2) 取付はM12ボルトを使用のこと。
 - 3) 空中線部の取付台にφ25-30のケーブル貫通穴を開ける。
 - 4) 初期製造分は取付寸法240x240で出荷しております。換装時に注意してください。

- NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 2. USE M12 BOLTS FOR FIXING THE UNIT.
 3. MAKE A HOLE φ25-30 IN MOUNTING BASE FOR CABLE ENTRY.
 4. NOTE FOR REPLACEMENT: FIXING HOLE DIMENSIONS ARE CHANGED FROM 240x240 OF PREVIOUS SETS TO 200x200.



DRAWN	Apr. 4 '05	E. MIYOSHI	MODEL 1964C/1964C-3B	TITLE	RSB-0070/0072/0073 (XN12A/13A)
CHECKED		TAKAHASHI, T	FR-701R-W2 FRS-ZS-100C	名称	空中線部
APPROVED		Y. Hatai	MODEL 1942P2 FR-706Z/711Z/725Z-ER-8X2 SERIES	外寸図	
SCALE	1/10	質量表2を参照 SEE TABLE 2		NAME	ANTENNA UNIT
DWG No.	C3459-G03-F				OUTLINE DRAWING

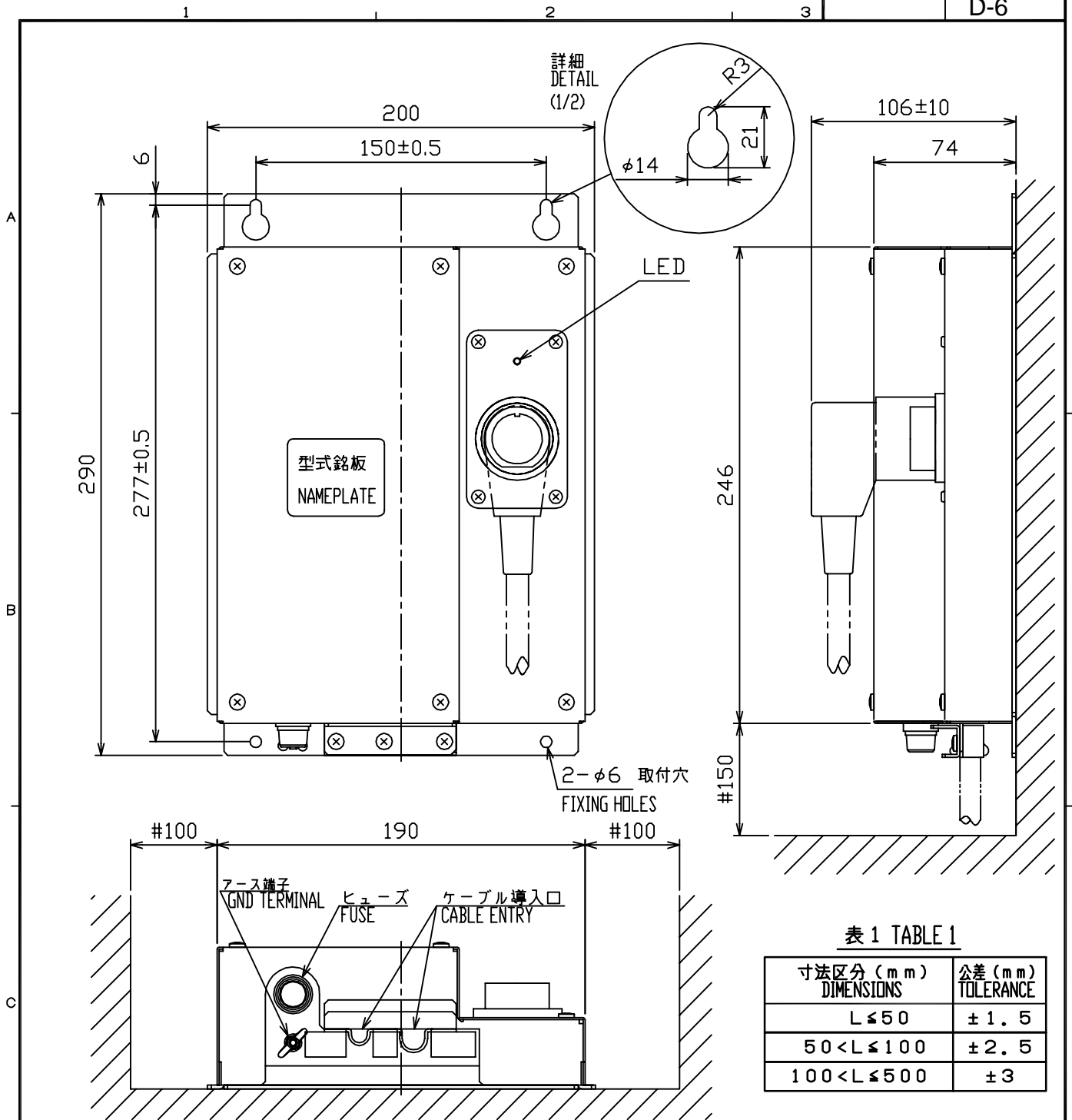


表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3

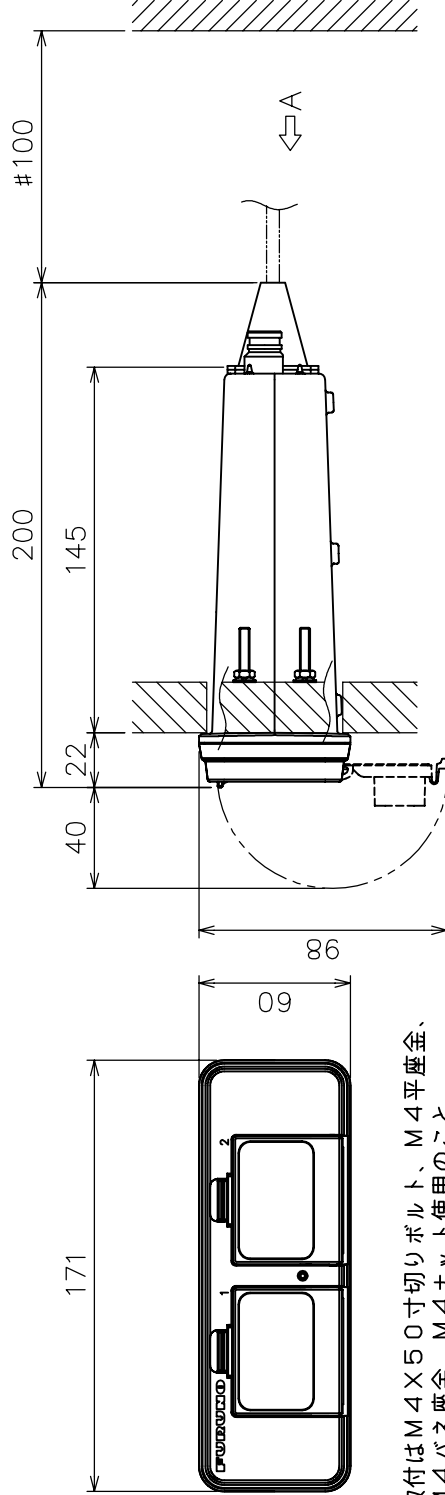
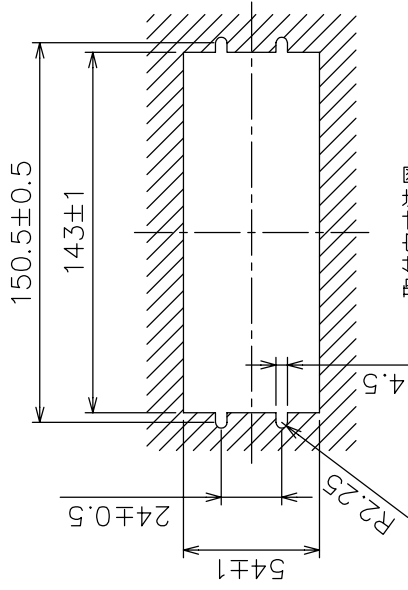
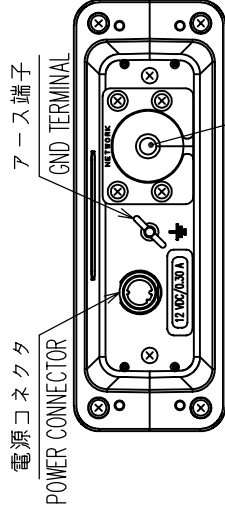
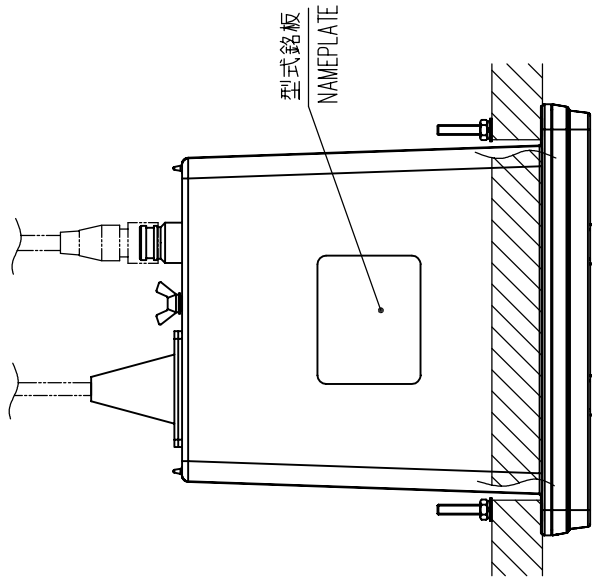
- 注 記 1) #印寸法は最小サービス空間寸法とする。
 2) 指定外の寸法公差は表 1 による。
 3) 取付用ネジは+トラスタップピンネジ呼び径 4 × 16 を使用のこと。

- NOTE 1. # MINIMUM SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 3. USE SELF-TAPPING SCREWS 4x16 FOR FIXING THE UNIT.

DRAWN Dec. 8, '02	E. MIYOSHI		TITLE PSU-005
CHECKED	TAKAHASHI, T	MODEL 1954C-BB	名称 電源部
APPROVED	Y. Hatai	MODEL 1954C MODEL 1953C	外寸図
SCALE 1/3	MASS 1.9 ± 10% kg		NAME POWER SUPPLY UNIT
DWG.No. C3512-G01-B		19-022-200G-2	OUTLINE DRAWING

表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



- 注 記
- 1) 取付は M4X50 寸切りボルト、M4 平座金、M4 バネ座金、M4 ナット 使用のこと。
 - 2) # 印寸法は最小サービスクリアランスとする。
 - 3) 指定外の寸法公差は表 1 による。

- NOTE
1. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERS AND M4 NUTS FOR FIXING.
 2. # MINIMUM SERVICE CLEARANCE.
 3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED	TAKAHASHI, T	MODEL 1833C	名称	防水型カードインターフェース(埋込装備)
APPROVED	Y. Hatai	MODEL 1833C-BB	外寸図	
SCALE	1/3	1/3	NAME	MEMORY CARD INTERFACE UNIT (FLUSH MOUNT)
DWG.No.	C3532-004-B	19-023-300G-1		OUTLINE DRAWING

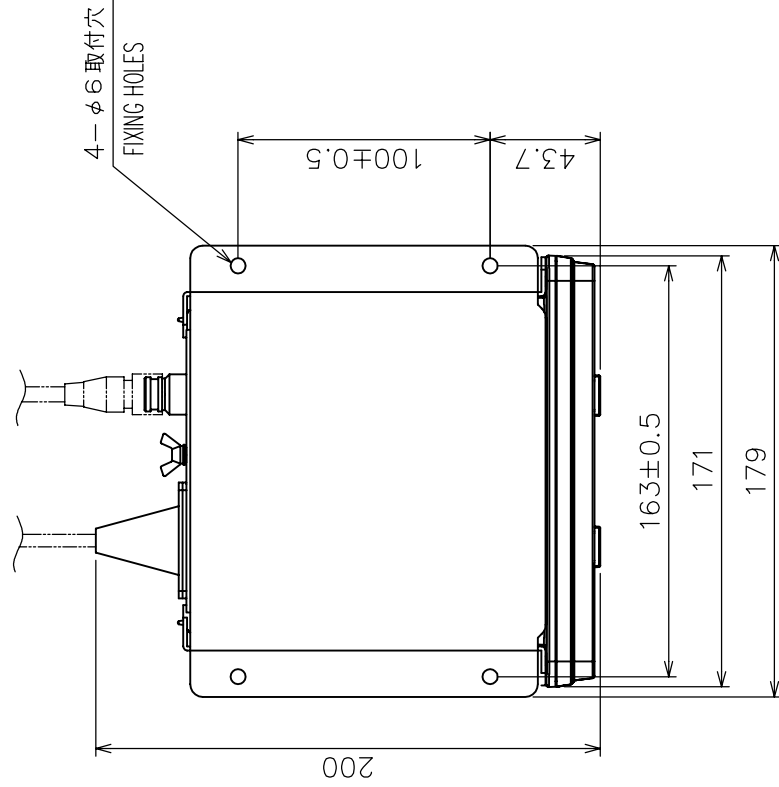
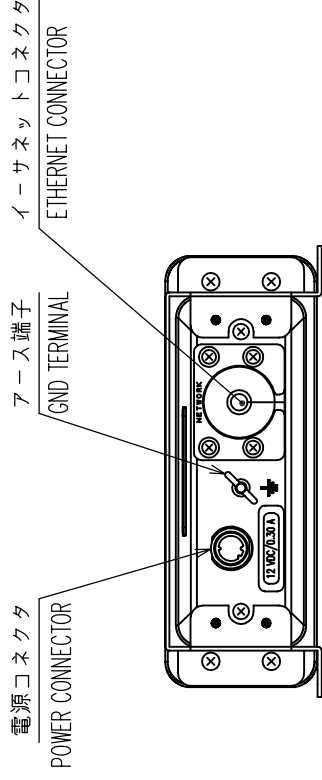
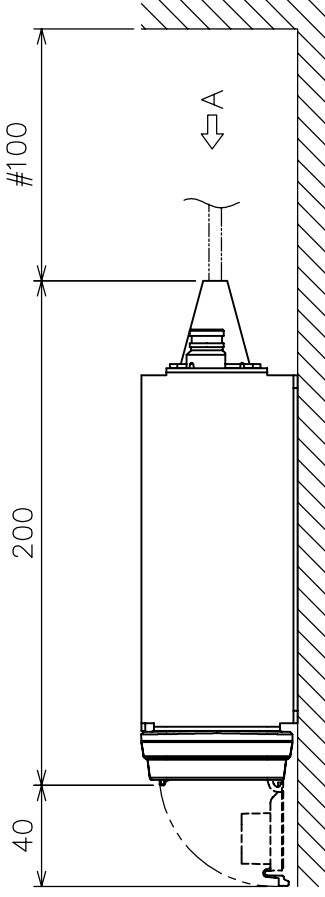


表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3



矢視 A
VIEW A



- 注 記
- # 印寸法は最小サービスクリアランスとする。
 - 指定外の寸法公差は表 1 による。
 - 取付用ネジは + トラスタップピンネジ呼び径 5 × 2.0 を使用のこと。
- NOTE
- # MINIMUM SERVICE CLEARANCE.
 - TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
 - USE SELF-TAPPING SCREWS 5X2.0 FOR FIXING THE UNIT.

DRAWN	Mar. 29, '04	E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED		TAKAHASHI, T	MODEL 1833C	名称	防水型カードインターフェイス(卓上装備)
APPROVED		Y. Hatai	MODEL 1833C-BB		外寸図
SCALE	1/3	1/MS	1.3	NAME	MEMORY CARD INTERFACE UNIT (TABLETOP MOUNT)
DWG. No.	C3532-005-B		19-023-310G-1		OUTLINE DRAWING

注記

- 1) #印寸法は最小サービス空間寸法とする。
- 2) 指定外の寸法公差は表1による。
- 3) 取付用ナットはM4ナットを使用のこと。
- 4) 取付板厚は最大8mmとする。

NOTE

1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE NUT M4 FOR FIXING THE UNIT.
4. MAX. MOUNTING BASE THICKNESS IS 8 MM.

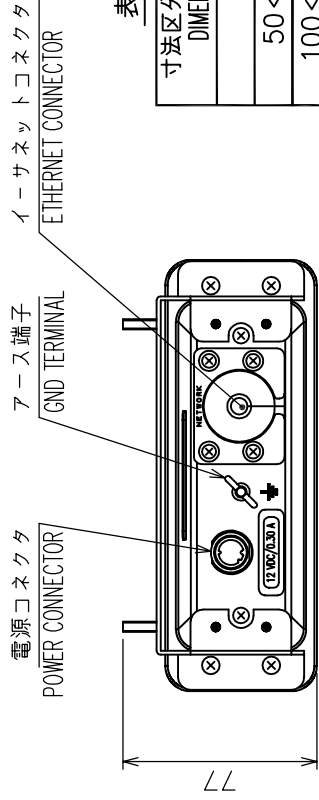
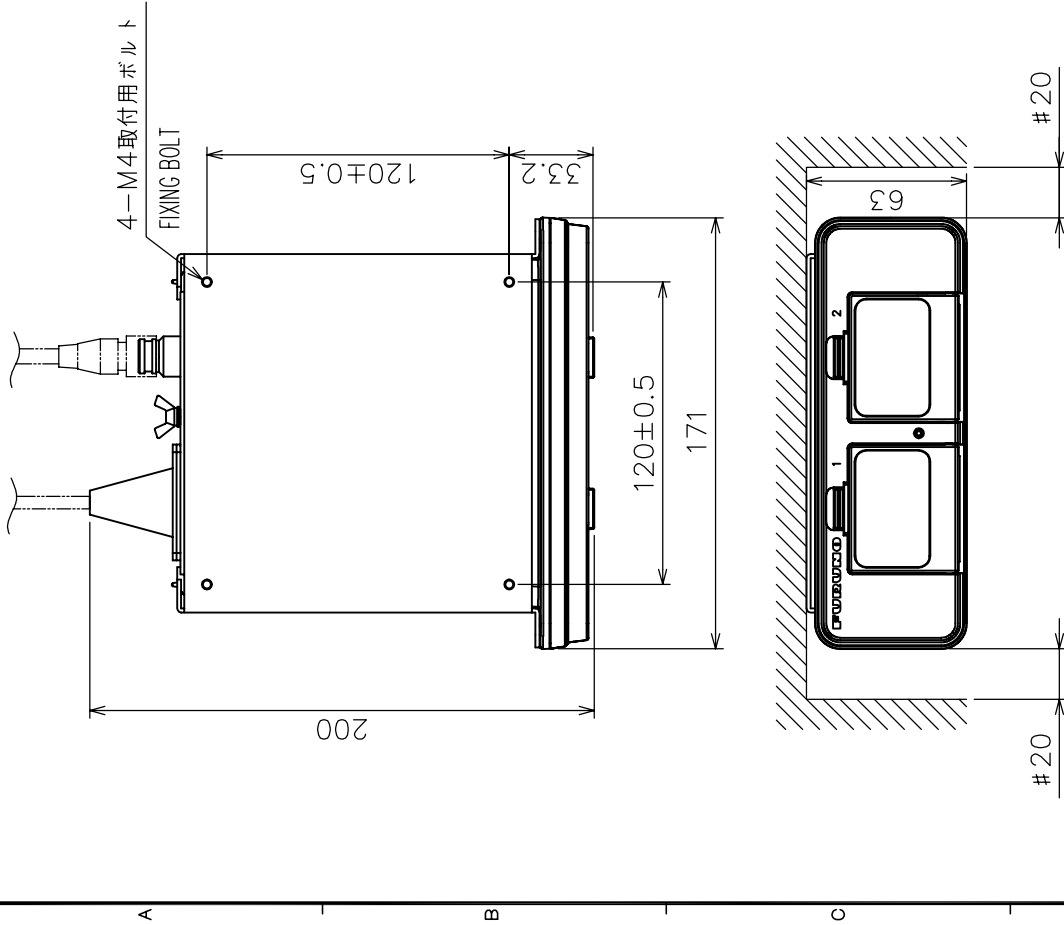
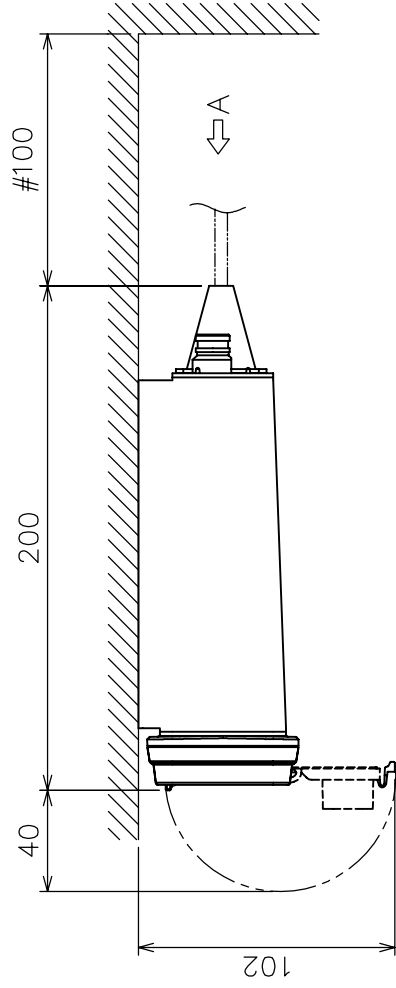


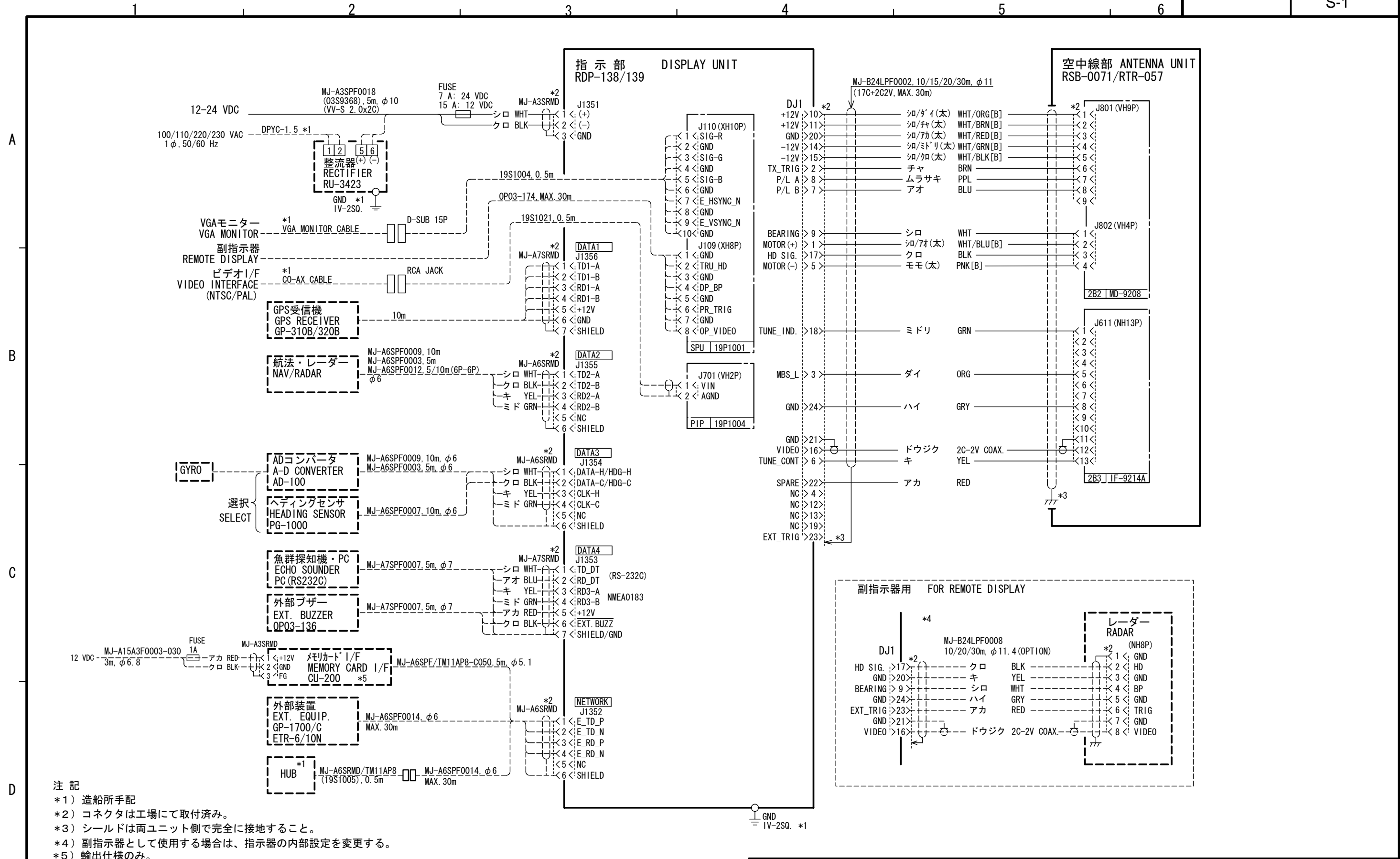
表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	± 1.5
$50 < L \leq 100$	± 2.5
$100 < L \leq 500$	± 3

矢視 A
VIEW A



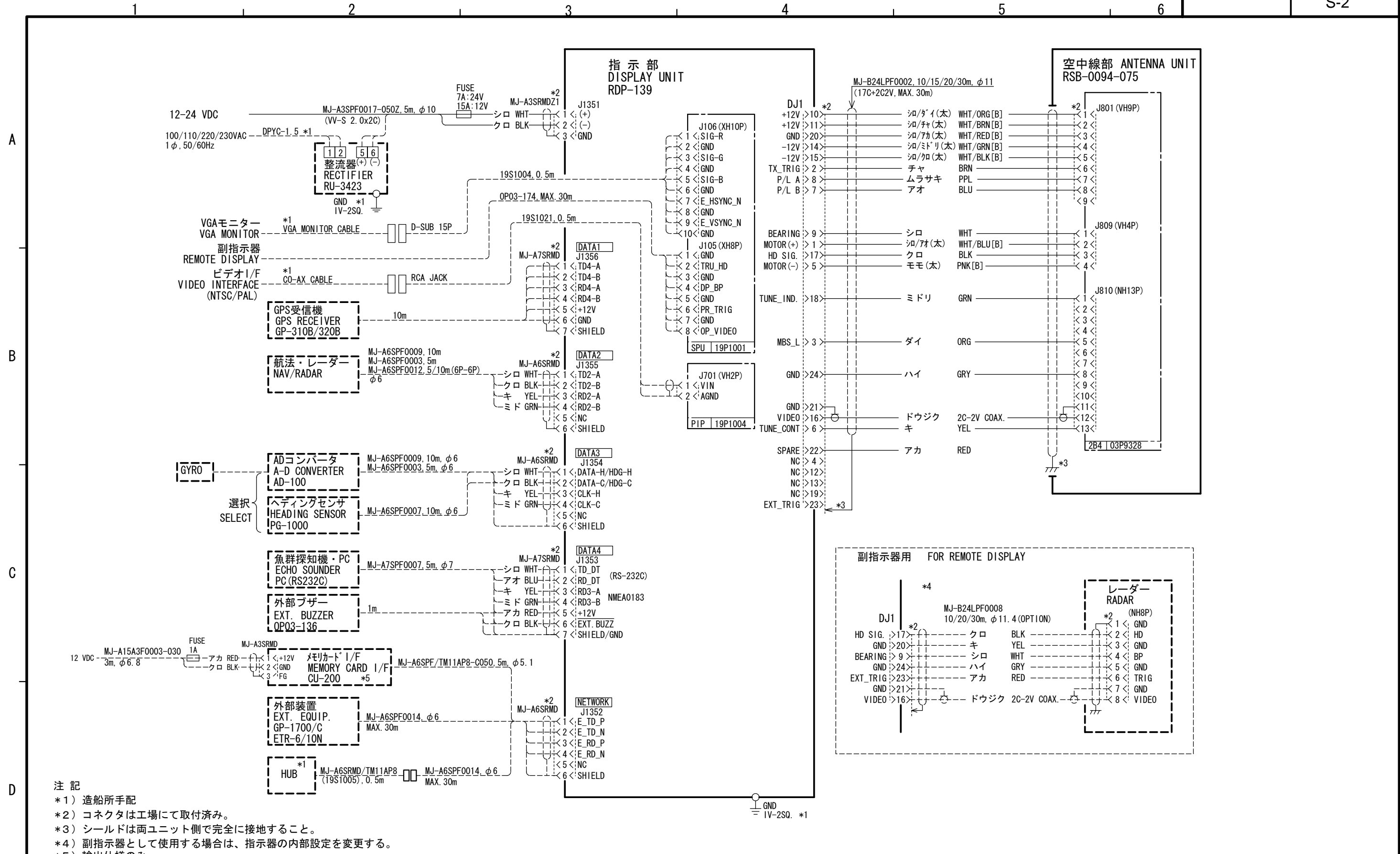
DRAWN	Mar. 29, '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED	TAKAHASHI, T	MODEL 1833C	名 称	防水型カードインターフェイス(天井装備)
APPROVED	Y. Hatai	MODEL 1833C-BB	外寸図	
SCALE	1/3	WAS 1.3	NAME	MEMORY CARD INTERFACE UNIT (OVERHEAD MOUNT)
DWG.No.	C3532-006-B	19-023-320G-1		OUTLINE DRAWING



- 注記
- *1) 造船所手配
 - *2) コネクタは工場にて取付済み。
 - *3) シールドは両ユニット側で完全に接地すること。
 - *4) 副指示器として使用する場合は、指示器の内部設定を変更する。
 - *5) 輸出仕様のみ。

- NOTE
- *1. SHIPYARD SUPPLY
 - *2. CONNECTOR PLUG FITTED AT FACTORY.
 - *3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
 - *4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
 - *5. OVERSEAS SPECIFICATION ONLY.

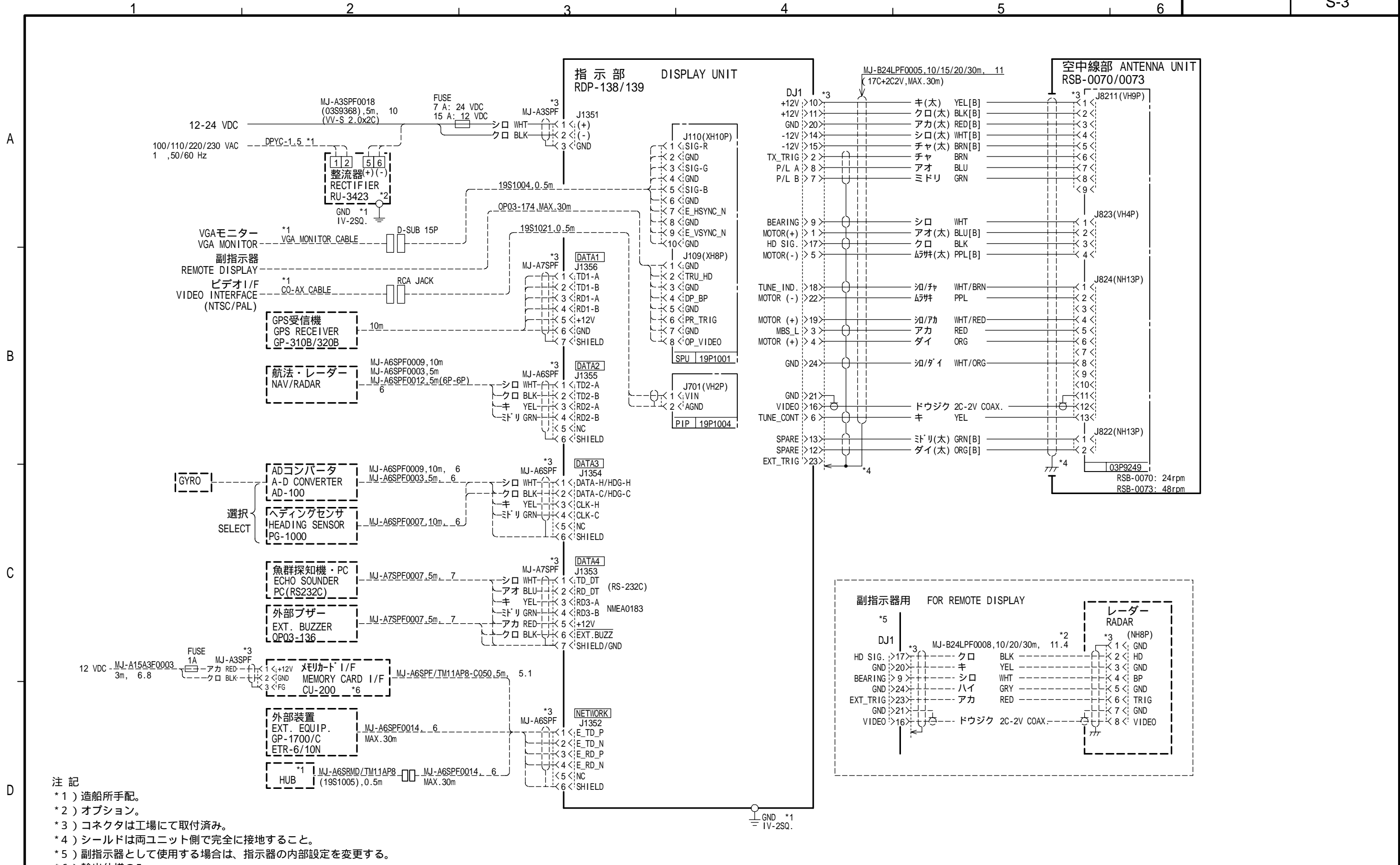
DRAWN May 28 '04 K. MIYAZAWA	TYPE MODEL 1833C
CHECKED TAKAHASHI. T	名称 船舶用レーダー
APPROVED Y. Hatai	相互結線図
SCALE MASS kg	NAME MARINE RADAR
DWG. No. C3503-C01- H	19-022-0006- 3 INTERCONNECTION DIAGRAM



- 注記
- *1) 造船所手配
 - *2) コネクタは工場にて取付済み。
 - *3) シールドは両ユニット側で完全に接地すること。
 - *4) 副指示器として使用する場合は、指示器の内部設定を変更する。
 - *5) 輸出仕様のみ。

- NOTE
- *1. SHIPYARD SUPPLY
 - *2. CONNECTOR PLUG FITTED AT FACTORY.
 - *3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
 - *4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
 - *5. OVERSEAS SPECIFICATION ONLY.

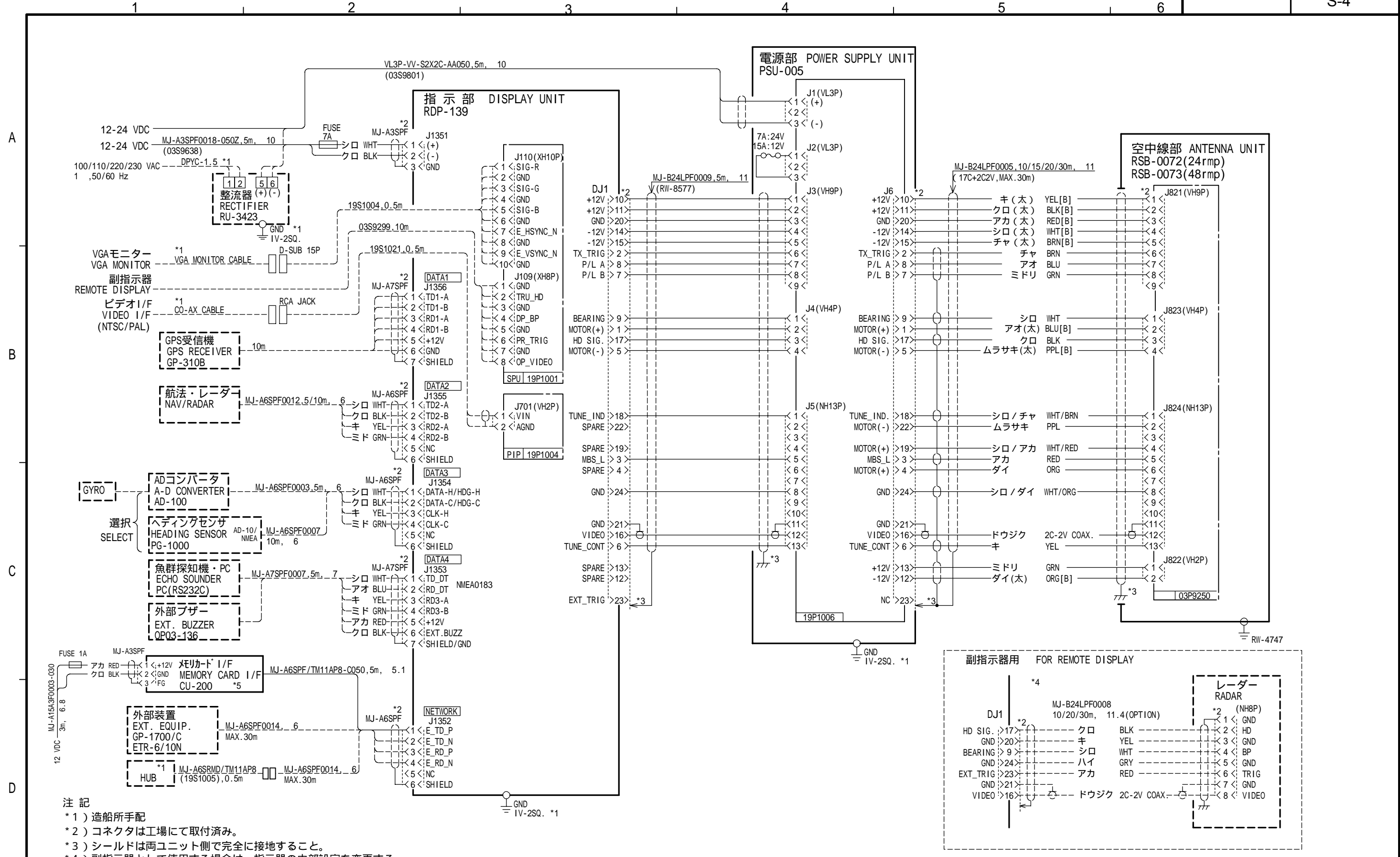
DRAWN May 28 '04 K. MIYAZAWA	TYPE MODEL 1823C
CHECKED TAKAHASHI, T	名称 船舶用レーダー
APPROVED Y. Hatai	相互結線図
SCALE MASS kg	NAME MARINE RADAR
DWG. No. C3513-C01- D	03-161-6001-1 INTERCONNECTION DIAGRAM



- 注記
- *1) 造船所手配。
 - *2) オプション。
 - *3) コネクタは工場にて取付済み。
 - *4) シールドは両ユニット側で完全に接地すること。
 - *5) 副指示器として使用する場合は、指示器の内部設定を変更する。
 - *6) 輸出仕様のみ。

- NOTE
- *1. SHIPYARD SUPPLY
 - *2. OPTION.
 - *3. CONNECTOR PLUG FITTED AT FACTORY.
 - *4. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
 - *5. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
 - *6. OVERSEAS SPECIFICATION ONLY.

DRAWN Nov. 18, '04 E. MIYOSHI	TYPE MODEL 1933C/1943C
CHECKED TAKAHASHI.T	名称 船舶用レーダー
APPROVED Y. Hatai	相互結線図
SCALE MASS kg	NAME MARINE RADAR
DWG. No. C3505-C01- K	19-022-0007- 3 INTERCONNECTION DIAGRAM



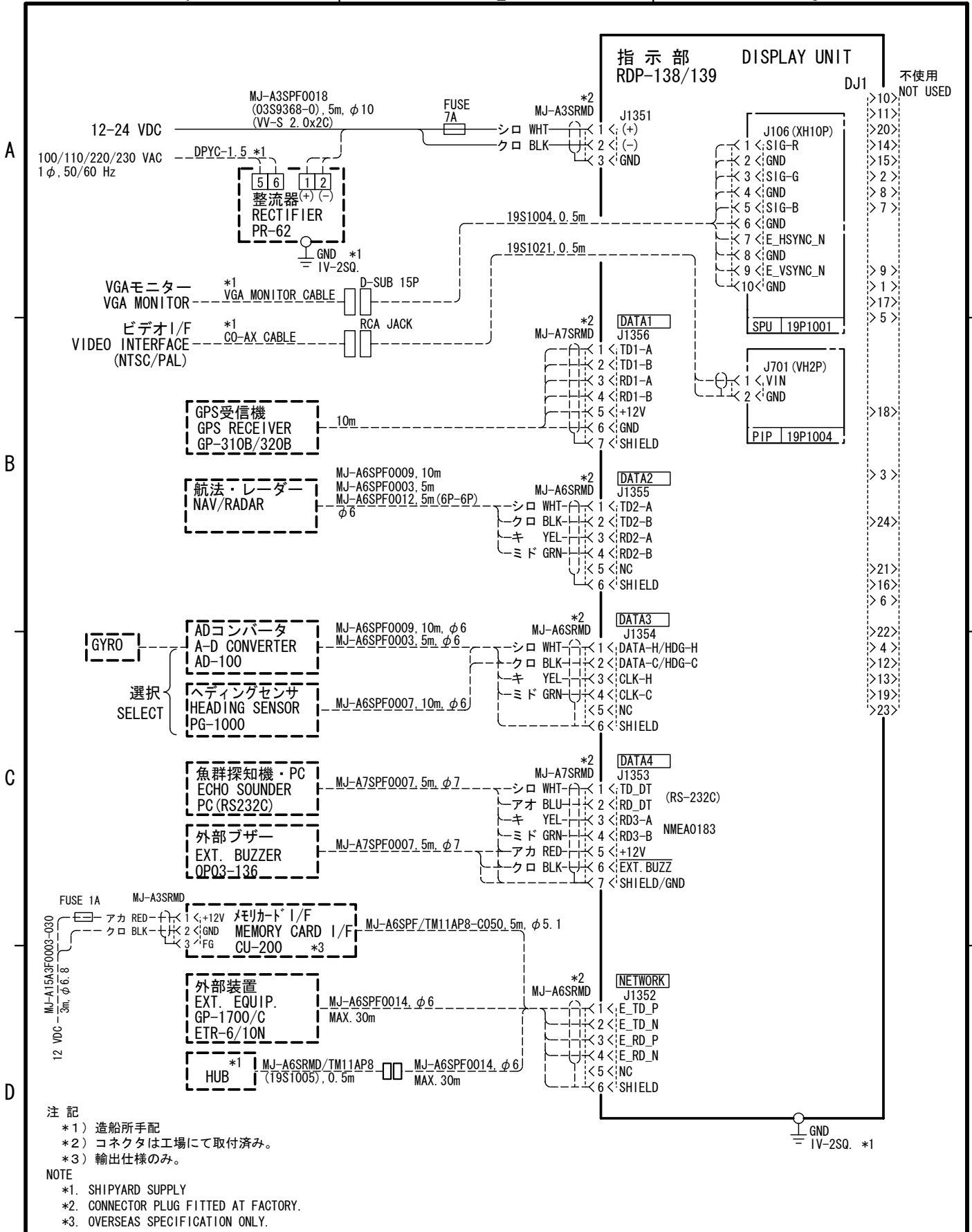
注記

- *1) 造船所手配
- *2) コネクタは工場にて取付済み。
- *3) シールドは両ユニット側で完全に接地すること。
- *4) 副指示器として使用する場合は、指示器の内部設定を変更する。
- *5) 輸出仕様のみ。

NOTE

- *1. SHIPYARD SUPPLY.
- *2. CONNECTOR PLUG FITTED AT FACTORY.
- *3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
- *4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
- *5. OVERSEAS SPECIFICATION ONLY.

DRAWN	MAY 19, '05 E. MIYOSHI	TYPE	MODEL 1953C
CHECKED	TAKAHASHI .T	名称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No.	C3512-C01- J		INTERCONNECTION DIAGRAM



DRAWN Apr. 1 '04 K. MIYAZAWA		TITLE GD-1900C	
CHECKED TAKAHASHI. T		名称 カラービデオプロッタ	
APPROVED Y. Hatai		相互結線図	
SCALE	MASS ±10% kg	NAME	COLOR VIDEO PLOTTER
DWG. No.	C4411-C01- G		19-022-0008- 1
		INTERCONNECTION DIAGRAM	